Making Sure of Arithmetic.
Book 2.
Morton Gray.
Teacher's Edition.

CURRICULUM

ng Sure of Arithmetic

OK TWO–TEACHER'S EDITION

LEE MORTON MERLE GRAY

ILLUSTRATED BY: *Milo Winter and others*

RITHMETIC IN GRADES ONE AND TWO

grade children are ready question is not whether an n is needed, but what kind of for young children.

of *Making Sure of Arithmetic* r a formal or rigid program in n the one hand, nor an unorganized al program on the other. They be- e basis of classroom experimentation, nized opportunities to learn should be . The learning experiences must be sys- because arithmetic itself is an organized, rated system. But sequential, planned ning experiences do not require regimenta- n or formality. The ideal program of begin- ng arithmetic capitalizes upon classroom situ- tions and the life needs and interests of the children. At the same time it gives the child complete and rounded arithmetical experiences.

Six- and seven-year-old children are used to dealing with the concrete. For this reason, *Making Sure of Arithmetic*, Grades One and Two, is rich in concrete experiences, dramatization, and kinesthetic activity. But the children must be encouraged to progress as rapidly as they can from the concrete to the semiconcrete toward the abstract. Therefore, *Making Sure of Arithmetic* in these grades consistently provides not only for concrete classroom experience at each step of the way, but also for less concrete experiences.

Making Sure of Arithmetic, Grades One and Two, helps the children to understand thoroughly all of the numbers from 1 to 10; to begin to understand two-place numbers and the decimal number system; to learn what addition and subtraction mean; to discover the addition and subtraction facts with sums and minuends to 10; to use these facts with understanding many times in problems, examples, column addition situations, and simple operations with two-place numbers; to see the relationship between addition and subtraction; to clarify and round out what they know about money; to gain clear ideas of certain unit fractions, certain measurement ideas, and many arithmetical terms; and to grow in problem-solving ability.

The learning program is most carefully and completely planned so that it is easy for the children and easy to administer, and yet makes sure of permanent understanding. In the program of the first two grades, for example, there are 34 separate groups of experiences which help the child increase his understanding of the number 4. All of the other numbers from 1 to 10 are treated with similar thoroughness. Yet this wealth of experience is woven into a genuinely easy program filled with variety and interest.

Both the first- and second-grade programs of *Making Sure of Arithmetic* consist of two books — one for the pupil and one for the teacher. The unique Teacher's Edition, printed in the same colors as the pupil's book, eliminates the need for consulting a separate guide.

The kind of arithmetic program presented in the first two grades affects crucially the future progress of children in arithmetic. *Making Sure of Arithmetic*, tested in the laboratory of the nation's schools, takes full advantage of the opportunities in these grades. This program provides a permanent foundation of meaningful arithmetic.

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OUTLINE OF THE GRADE TWO LEARNING PROGRAM

Telescoped Reteaching

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THE "MAKING SURE OF ARITHMETIC" PROGRAM

The whole purpose of the program presented in *Making Sure of Arithmetic,* Grades One to Eight, is to make it possible for children to succeed in understanding and using arithmetic. A program with this aim has to be planned and built around the growing child in a learning situation. It *is* so planned and so organized. It is a program which insists on the child's right to succeed in a subject which is admittedly difficult.

The program is scientifically organized both from the standpoint of the learning process and the nature of arithmetic itself. It recognizes that learning is a slow, continuous process and that arithmetic is a sequential subject, a system of interrelated and expanding ideas. It provides for continuous growth in the understanding of these ideas. Once an idea or topic is introduced, it receives *planned* attention throughout the remainder of this series of textbooks.

Arithmetic can be made less difficult for children if we recognize that the child does not learn any new arithmetic process or idea completely in any one grade. The arithmetic program must be based upon the principle of growth. It must be so organized that the pupil gains a richer understanding as he proceeds from grade to grade—as he becomes more mature. It must also take into account the fact that from one year to the next, and even during a school year, children often forget what they learn, no matter how well they have been taught.

The learning program of *Making Sure of Arithmetic* is based upon the principle of growth, and provides fully for continuous broadening and deepening of understanding from year to year. One of the most important provisions for growth, in each book of the series from the second grade on, is the reteaching section. The reteaching section redevelops and reteaches every topic, idea, and process previously introduced in the series. This new chance to understand and succeed at the beginning of the year not only helps all of the pupils to grow in understanding and skill, but saves from failure many pupils who otherwise would become learning casualties in arithmetic. It saves these pupils from the social and emotional maladjustments which result from failure.

It is a major function of the school to give the child the *security of understanding.* Security in arithmetic comes not only from repeated opportunities to learn at increasingly mature levels, but from the clarity and lack of distraction with which arithmetical ideas are organized and presented. When children learn that 4 and 4 are 8, they are ready to see immediately that 4 from 8 is 4. Thus, understanding the relationship between addition and subtraction reduces the difficulty of learning and is permanently meaningful. *Making Sure of Arithmetic* develops this essential understanding. It contributes to the child's security by making sure he understands what he will continue to use. It would be possible, of course, to help the pupil discover the fact $8 - 4 = 4$ in another way. For example, the child could "count backward" from 8 by ones until he had counted 4 ones: "7, 6, 5, 4." He could thus discover meaningfully that 4 from 8 is 4. However, *Making Sure of Arithmetic* avoids the use of this method and all such secondary approaches because they do not contribute to the child's security and will not be of permanent use. This device, and literally dozens of similar devices that seem meaningful on first inspection, are digressions from the main highway of meaning. They tend to confuse the child and threaten his security. *Making Sure of Arithmetic* is so planned that it gives the child the security of understanding.

Children will succeed in arithmetic and enjoy it if they are conscious of steady progress. To make steady progress, children must understand what they are doing when they add, subtract, multiply, or divide. They must understand the number system—that it is a system of ones, tens, hundreds, etc.—and they must understand the significance of zero and place value. They must understand the relationship between addition and subtraction; between addition and multiplication; and between multiplication and division.

They must see the relationships between operations with common fractions and with whole numbers, etc. Such understandings are continuously developed throughout the *Making Sure of Arithmetic* program.

The plan of this program is aimed throughout at developing permanent power in arithmetic. Some of the most significant parts of this plan are listed below.

(1) Every new idea or process is developed step by step.
(2) There is continuous redevelopment and reteaching throughout the series.
(3) The program anticipates, and therefore avoids, learning difficulties.
(4) It provides scientifically built and well-distributed practice in each book.
(5) The abundant motivation is skilful and resourceful.
(6) It emphasizes diagnostic testing which reveals to pupil and teacher just what the difficulties or deficiencies are.
(7) It provides a consistent maintenance program within each grade and from grade to grade.
(8) Provision is made for individual differences in ability and achievement at each grade level.
(9) It contains a carefully organized program of problem solving which stresses ability to see and understand relationships.

Making Sure of Arithmetic is not only thought out carefully in its structure and overall plan, but is created with infinite concern for the smallest detail. The language used in presenting ideas has been examined and re-examined, sentence by sentence, and word by word. The authors and editors have charted the use of every addition, subtraction, multiplication, and division fact, every common and decimal fraction, every divisor, dividend, and quotient, and every measurement concept, so that none of what the children have begun to learn will be neglected at any grade level. Prices of items used in problems are real as of the date of publication. Railroad and airline fares and distances are not imaginary, but actual. Information of vital social and personal importance has been built into the books as a basic policy rather than occasionally or by accident. The materials have been evaluated on the basis of how well children in thousands of classrooms have succeeded in using them.

In its learning organization, its provision for growth from year to year, its mathematical integrity, and its faithfulness to detail, *Making Sure of Arithmetic* was created to develop permanent power in arithmetic.

THE "MAKING SURE OF ARITHMETIC" PROGRAM FOR GRADE TWO

The program for Grade Two in *Making Sure of Arithmetic* has been planned and developed around the growing child in a learning situation. It is a program for teaching *children* arithmetic which recognizes the child's eagerness to learn and his right to succeed at each step of the way as he learns. The entire program has been planned and built with the most careful attention to the way in which the child learns.

The Need for Systematic Instruction

Prior to admission to the second grade, children have had a variety of experiences which are in part quantitative and hence have contributed to the development of number concepts. The children have learned some arithmetic, whether or not an organized program of instruction has been encountered in Grade One. A child entering the second grade knows how old he is, how much money he needs to buy a certain toy, how many members there are in his family, how many wheels he needs for the car he is making, the number of pieces he must have to share his apple with two friends, etc. He may also know how to count; he may know some addition and subtraction facts; he may be able to tell time. In fact, he may have developed a large number of quantitative ideas and some skill in using them in his daily activities.

However, to many children these ideas are vague. Some children have misconceptions about everyday quantitative situations. It is not uncommon to find the seven-year-old using cumbersome, roundabout methods; nor is it uncommon to find children of this age who fail when they try to cope with the quantitative situations that face them.

These children are ready for and need systematic instruction. The program as planned for Grade Two in *Making Sure of Arithmetic* takes the child where he is and rounds out his previous number experiences, makes them clearer and more complete, and advances his understanding and skill through systematic instruction.

Purposes of the Program

Three major purposes motivated the planning of the *Making Sure of Arithmetic* program for Grade Two. One of these purposes was to make it possible for children to succeed in understanding and using arithmetic, both in school and out of school. Another was to help them develop permanent power in arithmetic, which can come only from a program based upon the principles of growth, and designed for the continuous broadening and deepening of understanding as the program unfolds day by day. The third purpose was to make sure that each child would attain his maximum growth.

Other objectives of the program are:
(1) to put in order, sharpen and define, and make more nearly complete those number concepts which have already begun to develop in the child's mind
(2) to relate these ideas to each other, make them more meaningful, and in so doing, build toward permanent understanding
(3) to develop skill in using arithmetic in out-of-school experiences as well as in-school experiences
(4) to build a foundation capable of sustaining the program of arithmetic in later grades

The Systematic Character of the Program

Arithmetic is an ever-expanding system of interrelated number concepts. Understanding one phase of the system depends upon an understanding of preceding phases. For example, the child cannot add with understanding until he can count to determine the number of items or objects in each of the smaller groups which he is to combine and in the two groups together. He cannot see the relationship between pairs of addition facts (such as 3 and 2 are 5, 2 and 3 are 5) until he has actually combined 3 with 2, and 2 with 3, and has discovered that either way of combining these smaller groups results in a larger group of 5. The child can subtract 3 from 5, or 2 from 5 meaningfully, when he fully understands the significance of the related addition facts. Thus, each new experience depends upon understanding previous experiences.

The building of a genuine understanding of the addition and subtraction processes is not arrived at all at once. A systematic program of repeated, meaningful experiences is necessary to insure continued growth. This Teacher's Edition and the pupil's book present a teaching-learning plan and specific ideas for a systematic development of number concepts and skills.

The Learning Organization of the Program

When children are interested and can understand, they learn. In arithmetic, as in any other subject, they are interested if the concepts are presented in a way to show their usefulness, and if they are made understandable. Children understand, and are interested in, the things which are close to their experiences and are on the level of their maturity.

The content of the program of *Making Sure of Arithmetic,* Grade Two, is based upon the needs and experiences of children. The content has been analyzed to determine the learning steps which the child must take in order to learn it. Because these learning steps are organized into a teaching sequence that provides for ease of learning, the child, as he takes each new step, understands its relationship to the preceding step. In this way, the pupil grows in understanding arithmetic as a system of closely related, interdependent ideas and processes.

A genuine learning organization not only presents content in a learning sequence, in an interesting and familiar setting, and with clear and understandable language, but also presents it at a rate keyed to the child's ability to learn. While ample time is devoted to the development of difficult concepts, the less difficult are never neglected. Provision is made for the reintroduction of concepts at planned stages; hence no skill or understanding is allowed to deteriorate through protracted periods of disuse. Provision is made for the expansion of familiar ideas and skills as the child progresses, and as his foundations for additional understandings become more secure. In short, the learning organization of the program is designed to provide for continued, gradual growth in all aspects of the number program throughout the year.

Reteaching the Arithmetic Introduced in Grade One

Some of the children may not have had an organized, systematic program of arithmetic instruction during their first year in school. On the other hand, some of the children may have had the *Making Sure of Arithmetic* program for Grade One, or some other organized program. Whether or not the children have had an organized program, they will differ widely in their previous quantitative experiences, their understanding of numbers, and their ability to use arithmetic. Some of them will need another opportunity to learn some of the things about which they have vague ideas. Other children will profit from new experiences which will enrich and extend their understanding of the concepts developed during their first year in school.

It is the philosophy of *Making Sure of Arithmetic* to "make sure" of the pupil's understanding and skill in all phases of arithmetic previously introduced before proceeding with new work of the year. In keeping with this philosophy, this Teacher's Edition and the pupil's book, Grade Two, provide a "telescoped reteaching" of the program for Grade One, *Making Sure of Arithmetic.* The reteaching material is briefer than the original presentation—telescoped to meet the needs of these more mature children. It presents the ideas and concepts in a more mature way and often from another point-of-view—thus giving the children another chance to learn or an opportunity to enrich their learning.

The suggestions for the teacher and the materials in the pupil's book are planned to meet the needs of all children entering the second year of school whether or not they have had an organized program. It provides more than a review. In fact it gives the pupils an opportunity for a "new view" of the concepts and ideas they have met before. Some of the children will use these materials to build understandings and to develop the meanings which they have not previously gained. Others will use them rapidly to extend and enrich ideas and concepts which are not entirely new to them. Such a foundation is essential for the work which is to come.

The Teacher's Edition, pages 15–119, including pages 1 to 48 of the pupil's book, provides for reteaching the arithmetic usually introduced during the first year. The teacher will be able to use this material to discover the differences among the pupils in the class and to meet the needs of these individual pupils. It is expected that the teacher will select from the teaching suggestions those which her pupils need, but that she will use all of the material in the pupil's book to "make sure" that each child has developed the understandings and concepts presented. Many children can take this section of material quite rapidly while others will need all of the suggested preparatory activities and additional learning helps.

The New Work for the Year

The new work which is to be introduced in Grade Two will follow immediately after the reteaching of the work which was introduced in Grade One.

The program planned for Grade Two will undoubtedly prove to be a minimum program for some children who learn easily. They probably will do all of the suggested enrichment activities, and bring into the program arithmetic from their out-of-school experiences. On the other hand, the program will probably be a maximum program for some of the slower-learning children, who will need all of the suggested additional learning helps to fill in the gaps in background and make up for their lack of maturity.

The plans suggested for carrying out the program include ways of extending and enriching it and also of adjusting the content to the ability and maturity of the slower learners. It is the philosophy of *Making Sure of Arithmetic* that every child must experience success in the things he undertakes and feel that he is growing. Therefore the plan for this year includes suggestions for helping every child learn at his own rate and level of ability.

The program is based upon the conviction that arithmetic is *not* learned all at one time, but that many opportunities to learn, over a long period of time, lead from partial learning to eventual mastery. While the program for Grade Two will be retaught in Grade Three, many of the children in Grade Two will attain a high degree of mastery of the concepts and skills presented. Others will attain only partial learning and a minimum of skill.

The Realistic, Concrete Nature of the Program

Since this program of arithmetic is developed around the growing child in a learning situation, it draws heavily upon the realistic, common experiences of children and takes into consideration the way they learn. The situations in which young children use numbers involve concrete things such as toys, money, and materials of various kinds. The content of the program is planned around realistic experiences with these materials. The number stories (problems), the situations in which concepts are developed, the introduction of measures, etc., all utilize such experiences.

Dramatization—play acting—is one of the most fruitful ways in which children learn. Therefore this program utilizes dramatization as an important part of the plan for helping children understand the processes and the concepts to be developed.

Second-grade children need many concrete experiences before progressing toward the semiconcrete and the beginnings of the abstract. The emphasis throughout the program is upon developing an understanding of quantitative relationships and attaching meanings to them. The use of concrete objects, realistic experiences, and kinesthetic responses, as suggested in the Teacher's Edition, contributes richly to these understandings and paves the way for a meaningful approach to abstract thinking.

After the children have used dramatization and concrete objects, they use the teaching pictures provided in the pupil's book which illustrate realistic situations. These teaching pictures constitute a semiconcrete approach to the concepts and ideas being introduced. Thus the child moves gradually with each learning step from dramatization, to the use of concrete objects, to working with the semiconcrete (pictured objects), to the abstract.

The Problem Solving Program

The goal of all arithmetic teaching is to develop the ability to use numbers and do the precise type of thinking necessary for problem solving. In life experiences the need to use arithmetic grows out of problems which must be solved.

Second-grade children have problems to solve in their out-of-school experiences. Grade Two is not too early to begin the development of problem solving ability.

A systematically planned program of readiness for reading and interpreting problems (number stories) gets under way very early in the pupil's book. At first the stories are provided in the Teacher's Edition to be told to the children while they interpret a picture and answer the question that is asked. Gradually, step-by-step, the transition is made to stories which the child reads and interprets independently. At first the stories involve only addition. Then only subtraction is involved. Following these steps in the development of readiness, the two processes, addition and subtraction, are brought together and the relationship between them is explained. From that point on, the problem-solving program gradually expands. By the end of the year the children have had a wide variety of carefully planned experiences in problem solving.

Making Sure

The title *Making Sure of Arithmetic* is more than the name of a series of texts. It is the theme of a learning program that was planned to do just what the title says. The program was built around the hope that every child who uses it will gain genuine "sureness," understanding, and skill in using arithmetic.

This "sureness" will come in part from the provisions for evaluating the children's work at the end of each learning unit and from making a careful diagnosis of strengths and weaknesses. Following this diagnosis, the teacher and each child will know the specific relearning steps that must be taken before the child is ready to go on with the next learning steps. Since arithmetic is an ever-expanding system of number relationships, a new step cannot be learned until the foundation is laid.

A series of "Making Sure" tests, thirteen in number, occurs in the Grade Two program. These tests are placed at the end of each major learning unit and at the end of the book. The purpose and plan of the tests is to enable both the teacher and the children to find how complete the learning has been and what the specific difficulties are after a given learning unit has been completed. The tests at the end of the book are planned for an evaluation of the year's work.

Suggestions for retracing learning steps, as shown by the tests to be necessary, are provided in the Teacher's Edition immediately following the tests.

Making Sure of Vocabulary

Many of the mistakes children make in arithmetic are caused by the vocabulary. Yet there is a language of arithmetic which children must have access to. Much of this language must become a part of the reading vocabulary of the children.

In planning *Making Sure of Arithmetic,* Grade Two, the authors decided to cope with these two rather conflicting facts in a unique way. Many of the arithmetical terms needed by the children can become a part of their oral vocabulary at this grade level, but their introduction as part of the reading vocabulary may well be postponed until Grade Three. It was decided to introduce as part of the reading vocabulary in Grade Two only those arithmetical terms which the child must read. The other arithmetical terms were introduced, and defined, but made a part of the oral vocabulary only.

The vocabulary which is needed for a

problem solving program and for the semi-concrete stage of learning addition and subtraction had to be introduced. But, it was decided, even that could be controlled. The teacher *has* a responsibility for teaching children in Grade Two to read problems. But the vocabulary load can be kept to a minimum both in number of words and in reading difficulty.

Except for the absolutely necessary arithmetical terms, the vocabulary finally decided upon for *Making Sure of Arithmetic, Book Two,* consists only of preprimer, primer, and first reader words. It was decided also that this should become a "built in" vocabulary with every word introduced in the pupil's book in a realistic way and with not more than five new words being introduced on any given page. A careful tabulation was kept and a systematic plan worked out so that very gradually a vocabulary adequate for problem solving was introduced.

The sentence structure was controlled equally carefully. The reading standards usually accepted for Grade One were adhered to. This should assure the children of success with the reading of arithmetical materials and release the teacher to concentrate upon the development of arithmetical concepts and problem solving ability.

GENERAL SUGGESTIONS FOR CARRYING OUT THE PROGRAM

The preceding pages of the Teacher's Edition have given an overview of the arithmetic program for Grade Two as it was planned and developed. Intermittently throughout the overview has been interspersed something of the philosophy out of which the planning originated. Up to this point it has been the authors' program. But from this point forward it becomes the program of the teacher and her pupils.

The influence of the teacher is exceedingly great in translating the program into action and creating from it a series of rich and vital experiences for the children. Regardless of the philosophy on which the program rests, it is only through the teacher that arithmetic can become a satisfying and inspirational learning experience for the children. In truth it can be for the teacher herself a creative experiment in guiding children wisely.

The suggestions provided below are given in the hope that they will lead the teacher to think of ways to enrich the program and make it serve better the purposes and needs of children.

Providing a Stimulating Learning Environment

In days gone by, learning may have resulted in a schoolroom equipped only with books and benches. But experience has taught us that a program which aims to develop understanding and skill in using arithmetic will be more likely to succeed in an environment that has some of the characteristics of a learning laboratory. The materials and equipment needed are ours for the taking, because most of them are "cast off" or waste materials. Moreover, procuring such materials for their own use is in itself a rich learning experience for the children.

The reading table, the science shelf, and the art corner have become an accepted part of the equipment of the modern classroom. For a similar reason, an arithmetic corner or table or shelf is equally useful.

Often two orange crates, with a 6-foot, or an 8-foot board, salvaged from a scrap pile and nailed across the tops of the crates, serves as a substitute for a table or shelf. Three or five orange crates, stacked one on top of the other lengthwise, in stairstep fashion, and fastened together with nails or screws, serve nicely as open shelves to hold materials.

Making Concrete Materials Available

The materials provided for the arithmetic corner consist of concrete objects: toy money; pictures, often cut from magazines; practice materials; matching and counting games made by the children; quart, pint, and half-pint containers of a variety of kinds and shapes; foot rulers, yardsticks, tape measures; and so on. These materials should be used by the teacher and children to give meaning to concepts being developed.

Many suggestions for making games, charts, and study and practice cards will be made later. For those purposes the following materials should be available:

- pieces of cardboard, manila tag, the backs of writing tablets, or corrugated paper, a roll of wrapping paper, or wrapping paper salvaged by the children and brought from home
- large pieces of newsprint or other inexpensive paper with lines 2 inches apart for making charts, if available, or wrapping paper lined by the children
- paper 9 x 12 inches and 12 x 18 inches in size, ruled in ½″ and 1″ squares (if not available, can be mimeographed or hectographed by the teacher)
- paper pie plates for making clockfaces
- an old alarm clock
- pieces of wood, string, ribbon, and cord for measuring
- a wall card chart holder, which can be made by pleating a dry cleaner clothes bag and sewing it on the machine (leaving the clothes hanger in the top to hang on the wall)
- boxes containing 10 to 100 small objects such as buttons, pegs, golf tees, acorn caps, corn, well washed milk bottle caps, counting cubes, or parquetry design blocks (Each child should bring his own. They will be needed almost daily.)
- many counting sticks, toothpicks, milk-straws cut to about 2 or 3 inch lengths, strips of cardboard 1″ by 3″, to be used in bundles of 10 and singly to develop the meaning of numbers.

Having the children collect these things and get them ready for use is one excellent way to make sure that the children will use them during their leisure time to develop understandings and for practice.

Many of these materials are available commercially. But having the children collect them and bring them in or make their own is an excellent learning experience. Also there is likely to be more interest in the purpose for using the concrete materials and less interest in the materials themselves if they are simple everyday things rather than the kind that approach the toy or game category.

Utilizing Out-of-School Experiences

Another way to create a stimulating learning environment is to utilize the children's out-of-school experiences with arithmetic as often as possible. Having them keep a record of the money they receive and of the money they spend is an excellent way to help them realize that arithmetic is really useful to them. Often the number stories used in introducing addition or subtraction facts or in problem solving can be based upon out-of-school experiences.

Anticipating New Things in Arithmetic

Another excellent way to add to the enthusiasm for arithmetic is to tell the children ahead of time when something new is to be introduced. For example, the teacher might ask one of the boys to bring his set of small cars or airplanes to use in introducing a new arithmetic idea such as an addition fact. The children may find what things can be bought for a penny, a nickel, or a dime so that the realistic situations can be used next day when "buying and selling" are to be introduced in number stories.

Using the Teacher's Edition and the Pupil's Book

The Teacher's Edition and the pupil's book together constitute the program of instruction in *Making Sure of Arithmetic*, Grade Two. Neither is complete without the other.

Teaching is guiding learning. The teacher plans the procedures and guides the children as they follow those procedures. The child learns from these experiences.

If the teacher is to carry out the program she must have the security of knowing the aims and purposes of the authors as the program was developed. She must know what each learning step is which the child is to take. She must know also how that learning step fits into the entire program.

In addition to these things, most teachers believe that it is helpful to them to know what teaching procedures and what techniques the authors think will be most effective in guiding the learning of the child as he takes each learning step.

The Teacher's Edition is intended as the teacher's source book for planning. It is rich in suggested techniques and procedures. The teacher uses it as a guide in planning and as an explanation of the learning steps in the program.

The Teacher's Edition of *Making Sure of Arithmetic*, Grade Two, was planned and written with as great care as was the pupil's book. It brings to the teacher for every large learning unit an overview of that unit. The overview presents the general suggestions for procedures and explains the relationship between that unit, preceding units, and units to follow. It guides the teacher in the long-time planning for the children.

The day-to-day suggestions for each page of material in the pupil's book—for each learning step which the child must take—include the following:

"Preparatory Activities." Here the teacher has an explanation of the purpose of the page in the pupil's book and a carefully thought out plan for using realistic and concrete materials before the pupils are given the exercises in their books.

"Using the page in the pupil's book." There are, in the pupil's book, only those directions which he can read for himself. Since an effort was made to keep the reading load for the child as light as possible, the detailed directions for using the material are in the Teacher's Edition. The exact procedure which the child should follow is given for the teacher at this time.

"Follow-up Activities." These are rich in suggestions for evaluation of the pupil's work and for determining what should be done before the children go on to the next learning experience. "Additional learning helps" are suggested for the slower learners. These are intended to help the teacher direct the children who had difficulty, while they retrace the necessary learning steps so that they can succeed. "Enrichment activities" are suggested for the faster learners who can do more than the work suggested in the program. These are designed to extend and enrich understandings and to permit these children to make other applications of what they have learned. Sometimes the suggestion is made that these children do other things than arithmetic, if that seems wise.

The pupil's book is an application book. As has been pointed out earlier, the entire program in Grade Two is developed around realistic experiences followed by the use of concrete materials, and finally followed by the use of semiconcrete and abstract experiences. The pupil's book provides the latter experiences. In it the child applies what he has learned concretely and through the use of realistic experiences. It is the plan of the program to have the learning steps so carefully developed before the pupil's book is used that he is ready to apply what he knows with success.

This plan is based upon the laws of learning, which hold that to learn one must first understand completely what he is to learn. Then he must try it out—practise it—and then apply it in a slightly different type of situation. The pupil's book provides the latter type of experience.

Evaluating Learning

Helping the pupil make sure of his progress. Success in arithmetic comes with growth in understanding and skill and with sureness in working and thinking with numbers. For the children, an important element in this type of growth is an awareness of progress and an alertness to what they need to do in order to succeed. The organization and approach of the Teacher's Edition and the tests make it possible for the teacher to discover what needs to be retaught, and to help the child understand what he needs to relearn.

The teacher, by her approach to this problem, can help each child realize that he is making progress, and make him aware of what he can do to make greater progress. By pointing out to each child exactly wherein he has succeeded, and what he needs to make sure of, the teacher can help the child, even at this grade level, to recognize that learning is an individual matter.

Friendly and encouraging comments made to the pupil as the teacher goes about the room, works with him, or goes over his arithmetic papers with him, can serve this purpose. Such comments will encourage the pupil and at the same time direct his efforts toward a definite goal. They also point up for him his responsibility for his own progress. Suggestions of this kind help him to think of success in his work in terms of his own growth and achievements rather than in terms of marks or grades. No greater contribution to education can be made than to substitute for the pupil's notion that he is working for the teacher, the idea that he is learning something for himself and on his own responsibility. We cannot begin too early to help the pupil develop this attitude toward his work.

Finding the difficulties of individual children. The teacher who sincerely believes that all children can and should learn arithmetic and enjoy it, believes also that, in order to succeed and get satisfaction from arithmetic, children must be helped to develop a sound foundation on which to build. She will wish to observe the children at each step of the way, and be constantly on the alert for indications of confusion and gaps in learning. This means that she will study each child's work and analyze his papers, especially his test papers, to find the causes of difficulty, so that she can help him overcome those difficulties.

The teacher will recognize the opportunity for such an analysis after the pupils have taken the tests which follow a series of related learning steps. She will wish to use the test results as an index of growth on the part of each child and as an indication of what he should do next, rather than as material to serve merely as a basis for giving a mark. She will wish to point out to him, not that he has failed, but that he has succeeded in certain things, and that she will help him to learn other things so that he can succeed in these as well.

Keeping records of progress. The teacher will recognize that, if she is to be able to help children attain their maximum growth, she must know specifically what progress has been made and what has yet to be learned. The teacher may wish to consider ways in which she can keep records of progress for individual children from day to day and week to week. She will be concerned with the problem of planning a form of record that can meet her needs and the needs of the children without requiring much of her time.

Some teachers find that an arithmetic folder for each pupil meets these needs. During an art period the pupils may make folders of the proper size to hold arithmetic papers. Since the papers indicate what has been learned, as well as what needs still further attention, they become a record of individual progress. The folder can be sent home from time to time for the parents to examine. It serves also as a helpful basis for conferences when the parents visit the school.

In addition to the pupil's papers, the teacher will wish to keep for her own use brief notes about each pupil's progress. These notes will include comments about strengths and weaknesses. They will, as often as possible, include the *what*, the *why*, and the *plan* for correcting any difficulties the child may be having. Since growth in arithmetic is a part of the child's total growth pattern, the notes may contain comments on other things besides arithmetic. Mental, emotional, and physical health may be among the factors contributing to success or failure. Notes on such factors may be most revealing as time goes on.

The teacher will certainly wish to include in her records a list of specific things the child has learned and the specific things he needs help in learning. Many of the items to be recorded can be indicated by a very few words. Others can be recorded on check lists that can be mimeographed or duplicated so that a copy can be available for each child's folder. The check list of addition and subtraction facts discussed on page

182 of this Teacher's Edition is an example. Various marks on such lists can indicate which specific facts were learned and which ones are causing difficulty for the individual child.

Probably the most valuable record is that which consists of the teacher's brief, dated comments, written on a sheet of paper. If the comments are kept brief and specific, they become a very useful record of growth and also a record of the things that helped the teacher bring about that growth.

Teachers usually find that there is only a very small group of children in each class who have difficulty with arithmetic. It is often true that only certain phases of the work cause this group difficulty. Therefore, the records for many of the children can be very brief. In many cases it has been found that having a specific record enables the teacher to discover at once the cause of the difficulty, and directs her efforts in aiding the children to overcome it. As a matter of fact, experience indicates that in a great majority of cases the period of time over which detailed records are needed is very short. The records help both the teacher and the child to get at the crux of the difficulty very early. Once the difficulty is understood, the teacher and child can work together to remove it.

Meeting the Needs of All Children

One of the objectives of *Making Sure of Arithmetic* is the maximum growth of each child. The authors recognize that some children have had richer and more varied number experiences than others have had. Furthermore, it is understood that some children are considerably more mature and more capable of rapid progress than others. The Teacher's Edition suggests, therefore, specific ways of giving attention to individual needs. For the less able pupils, many additional opportunities for responses and discoveries are provided; for the more able pupils, there are opportunities to make applications of arithmetic at a more mature level.

Retracing learning steps with slower learners. The reteaching that is planned for the slower learners will be determined by their specific needs. The teacher will realize, as she analyzes their work and makes notes about their specific difficulties, that more practice alone is not what they need. They must first retrace the learning steps which they failed to take with success when the work was presented. The chances are that partial learning took place and that going over the steps again will give these children the one more chance which they need to understand completely what was only partially understood before. This will make the difference for these children between discouragement and the satisfaction that comes when the work is understood. Teachers find that while it does take time to retrace learning steps, time will be saved in the long run.

When the teacher knows which are the specific learning steps that are causing difficulty in the program covered so far, she will wish to carry out again the suggestions in the Teacher's Edition that applied to those learning steps. In some cases it may be necessary to use concrete materials again, then to use pictured materials, and finally to provide practice materials. The amount of practice and the type provided will be keyed to the needs of individual children.

They will not all need to retrace all of the learning steps. For some there may be only a few steps that are causing difficulty. As soon as these children have made up their deficiencies, they may work with the children who are doing the enrichment exercises while the teacher devotes more time to the few children who need more thorough reteaching.

As was pointed out earlier, learning is an individual, personal matter. The fact that a child has difficulty does not need to become a cause for discouragement. By the teacher's approach to the problem, she can help the individual child and the group as a whole to accept needed help in arithmetic just as they would accept it in building a pen for a pet. As long as the teacher's attitude and her manner of working with the group encourages the willing acceptance of needed help, the slower learners will retain their self-respect.

UNDERSTANDING NUMBERS TO TEN

A child's understanding of numbers must be extended gradually. The ability to count objects is a foundation for further experience which leads to the ability to think in terms of groups. The child must understand that a number such as 8 may represent a group of things; for example, 8 balls. He must come to understand also that a group of 8 may be made up of smaller groups, as 4 and 4, 2 and 6, 7 and 1, and so on, and that these smaller groups are parts of, or can become parts of, a larger group. In order to acquire these understandings, the child must have a series of closely related learning experiences.

Counting. Counting is the first step in gaining an understanding of numbers and in giving meaning to addition. Most children entering second grade will be able to repeat the number words in sequence, but some may do so with little or no understanding. Experience in counting is not only essential to those who have not yet developed this skill, but can be useful to all children as a means of enriching their understanding of numbers. Ability to count to 10 is, of course, prerequisite to reading and writing number symbols and number words to ten.

Reading and writing numbers. Because the need to read number words and to write number symbols increases sharply in Grade Two, it is important that children learn as quickly as possible to recognize the words *one* to *ten* and to write the numbers *1* to *10* accurately and with facility. Many mistakes in arithmetic are caused by poorly written numbers. It is extremely important that individual difficulties be identified and corrected before such faults as reversals, badly formed loops, cramped figures, and so on, become fixed habits that will be difficult to correct. For these reasons, reading and writing of numbers is introduced immediately after experiences in counting and *before* the children are asked to read or write number symbols or number words on the pages which follow.

Recognizing groups. Up to page 4 in the reteaching section of Book Two, the children use numbers to count concrete and pictured objects. Their next learning step is to think of numbers as representing groups of objects. Pages 4, 5, and 6 of the pupil's book are designed to help children understand groups, and to discover the various ways of combining objects to make up groups of 2, 3, and 4 objects.

In the process of understanding groups, the children learn that a group is more than one (two or more things together). They learn to identify the number of things in a group, to recognize the larger and smaller of two groups, and to identify groups that are equal (have the same number of things in them). All of these concepts and abilities are necessary to an understanding of the meaning of addition and subtraction. They also strengthen understanding of the quantitative meaning of numbers.

Experiences with groups of 2, 3, and 4 in this section help the children to visualize a group of 4, for example, as being made up of 2 and 2, 3 and 1, or 1 and 3. The children work with groups of actual objects in the classroom and with semiconcrete, or pictured, objects in their books. They discover for themselves the various ways in which groups of 4 can be made up of two smaller groups or of 1 and a group. These experiences are followed immediately by the reteaching of addition facts with sums of 2, 3, and 4. In the same way, experiences with groups of 5 and 6 immediately precede the reteaching of addition facts having sums of 5 and 6.

Before subtraction facts with minuends to 6 are retaught, further experiences with groups are provided to get the children ready to subtract with understanding. In these experiences, the child looks first at the whole group, and then discovers the smaller groups within the larger group.

After the reteaching section, new facts having sums or minuends of 7, 8, 9, and 10 are taught in related groups, such as $6 + 1 = 7$, $1 + 6 = 7$, $7 - 6 = 1$, $7 - 1 = 6$. Before each new group of facts is taught, readiness experiences in grouping are provided.

RATIONAL COUNTING TO TEN

Preparatory Activities

Page 1 of the pupil's book provides experiences in rational counting to 10—the first step in gaining an understanding of numbers, groups, and the process of addition. Rational counting consists of associating one, and only one, of the number words successively with one, and only one, in a series of things to be counted.

One-to-one correspondence. Rational counting is based upon an earlier learning step—experience with one-to-one correspondence. Before the child is ready to associate a number word with the object counted, he should be able to match the objects in one group with related objects in another group. It is likely that every child in the room can do this. However, certain activities will help the teacher make sure that this is the case. For example, the teacher may hand a stack of books to a child and ask him to pass one to each child in a group. The pupils then discuss whether there was one for each child, more than enough for one for each child, or not enough for one for each child. In working with any children who need further experience with one-to-one correspondence, the teacher should take care that matching, rather than counting, experiences are provided.

Counting concrete objects. Before the children count the semiconcrete (pictured) objects in their books, they should count real things. As a child counts the chairs at a table, for example, he should touch a chair each time he says a number word.

After the experiences with counting concrete objects, use page 1 in the pupil's book.

Using Page 1

Have the pupils identify the different kinds of animals and the clowns in the picture. Then ask them to count the things in the picture to find the answers to such questions as the following:

How many elephants are there? (3)

How many camels are marching? (5)

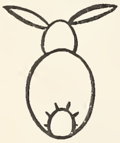
How many clowns are in the ring? (8)

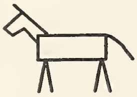
How many dogs are in the parade? (10)

Follow-up Activities

Additional learning helps. At this time, the children who need further practice in counting can assemble bundles of sticks by counting out 10 sticks, milk straws, or toothpicks, and placing a rubber band around them. These bundles will be needed later.

The teacher may make pictures of 5 rabbits, 10 horses, etc., for the children to count. Simple drawings such as these will be easy for the children to identify:





Have the children count as they make dots, lines, or other marks with a pencil or chalk. Have them count in response to sounds made by the teacher, such as tapping, clapping, bouncing a ball, etc.

Enrichment activities. Children who demonstrated their ability to count to 10 without difficulty may make ten number cards, one card for each of the numbers from 1 to 10. The cards may be made on 6″ x 9″ or 9″ x 12″ pieces of cardboard or art paper. The numbers may be represented by pictures drawn by the child; for example, three trees for the number 3, or six squares for the number 6. These sets of cards may then be used by any children who need further experiences in counting. The teacher may wish to begin a permanent arithmetic shelf or table of concrete materials with these cards.

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NUMBERS AND NUMBER WORDS TO TEN

Preparatory Activities

Some children may be unable to read the number words or to write the number symbols correctly, although others may need only to improve their skill. The exercises on pages 2 and 3 are designed to help children in either category.

Building a number chart. Before using pages 2 and 3 in the pupil's book, the teacher will find it helpful to build a large number chart to introduce the number words *one* to *ten,* the symbols *1* to *10,* and the quantitative meaning of these numbers.

The first step in building the chart should be with small concrete objects, such as parquetry design blocks, or bottle caps, which each child should have. (See page 11.)

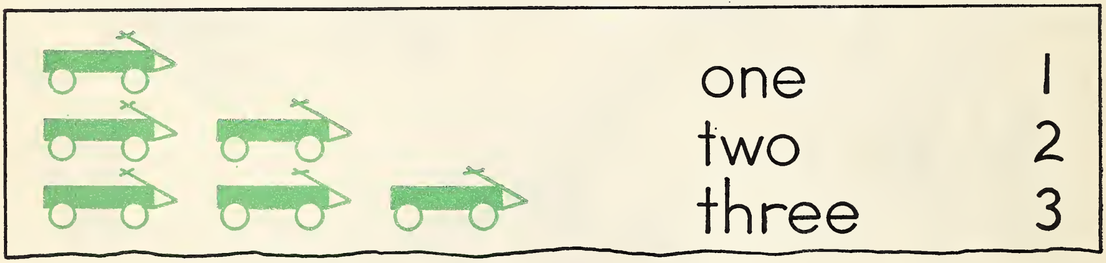
Have each child place 1 block on his desk. Ask a child to tell how many he sees. Write *one* on the blackboard. Explain that the word tells how many blocks there are. Write *1,* and explain that it also tells that there is one block.

Next, begin to build the number chart. Draw 1 picture on the blackboard, perhaps a wagon, or a circle, and write the word *one* and the symbol *1* beside it.

Then have the children place 2 blocks on their desks. Ask a child to count them. Write the word *two,* and ask a child to read it. Then write the symbol 2, showing just where to begin it.

Then draw 2 objects on the chart being built on the blackboard; write the word *two* and make the symbol *2.* Continue through 10 in the form shown below.

This experience in chart building is valuable because the children see the chart developed with concrete objects, with semiconcrete (pictured) objects, and with the number words and symbols associated one with the other. This chart, which will be replaced later by one showing 10 tens, or 100, is the first step in understanding our number system as a system of tens.



Using Page 2

Call attention to the pictures of trees and help the children discover that the number words and the figures tell how many there are in each row of trees. Then explain that, in the second copy of each figure, an arrow shows the direction of each stroke in making the figure. The correct way to write each number may be demonstrated again at the blackboard to make sure the children know how to write it correctly.

In the first exercise the children count the objects, trace the numbers outlined in broken lines, and write the numbers independently in the last two columns. This exercise should progress one row at a time with teacher supervision.

In the next exercise the children read the number word, and trace the number and the pictures in each of the first two rows. For the numbers 3 to 5 the children read the number words, write the numbers, and draw pictures to show what the numbers mean.

In the last exercise the children read each number word and write the number symbol for which it stands. This exercise will enable the teacher to find which children need further help in recognizing the number words and writing the numbers 1 to 5.

	one	1	1			
	two	2	2			
	three	3	3			
	four	4	4			
	five	5	5			

one	1					
two	2					
three						
four						
five						

four one three two five

_____ _____ _____ _____ _____

Numbers and Number Words to Ten (continued)

Using Page 3

The teaching procedures suggested for page 2 apply also to page 3.

Point out to the children that on page 3 the number words and the figures tell how many trees there are in each row.

Explain also that the number 10 is made up of two figures, a *1* and a *0*, and that care should be taken to make the two figures so there is a little, but not too much, space between them. Note that the figure *0* is called *zero*—not *aught, naught, oh,* or *a cipher.*

In the second exercise, the children trace the 6 and the six trees. Then they write the number 7 and draw trees to show what the number means. The same procedure should be followed for 8, 9, and 10.

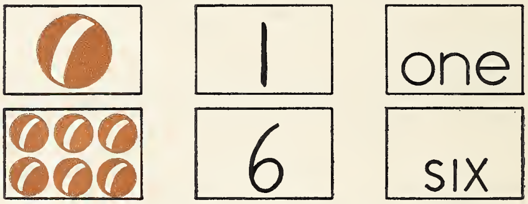
Follow-up Activities

Additional learning helps. At this point, the teacher will wish to give individual attention to those children who experienced difficulty in working with pages 2 and 3. The following activities are suggested:

Each child may use his box of small concrete materials for this exercise. (See page 11.) Direct the children to place objects on their desks in this order: first 1 object, then 2, then 3, and so on, to 10 objects. Then have them count the objects in each row and write the corresponding number symbols in a column. Squared paper would be useful for this exercise. There is no need for these children to write the number words.

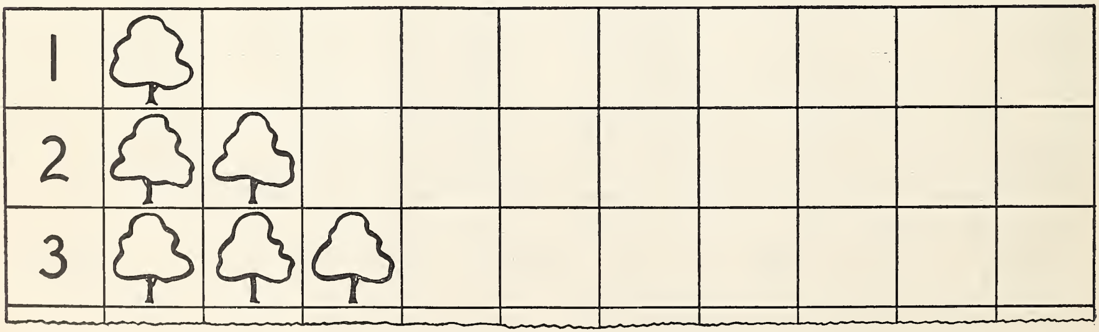
Following the counting experiences, have the children make a chart on 1-inch squared paper. They may color the squares or draw pictures for each number from 1 to 10, as illustrated below.

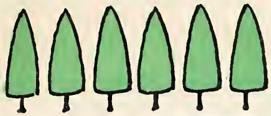
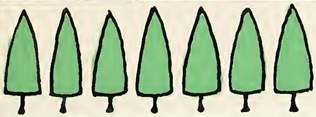
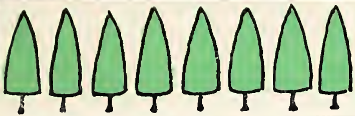
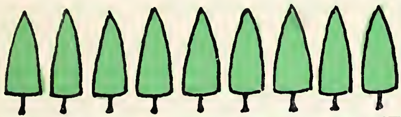
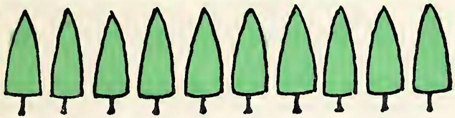
Give each child who needs further help 30 pieces of cardboard. On one card he makes a picture of 1 object, such as a ball. On a second card he writes the number *1.* The teacher writes the word *one* on a third card. The same procedure is followed with the numbers through 10. For example:



When the sets of cards are completed, the children may mix them and then match them to practise recognizing numbers.

Enrichment activities. Those children who do not need help with number symbols may practise writing the number words *one* to *ten.* They will enjoy making number charts similar to the one suggested under preparatory activities.



	six	6	6		
	seven	7	7		
	eight	8	8		
	nine	9	9		
	ten	10	10		

six	6										
seven											
eight											
nine											
ten											

eight ______ six ______ nine ______ seven ______ ten ______

RECOGNIZING AND COMPARING GROUPS

Preparatory Activities

Page 4 of the pupil's book is designed to help children learn that a group is more than one (two or more things together). It also teaches them to identify the number of things in a group, to learn to recognize the larger and smaller of two groups, and to identify groups that are equal—have the same number of things in them.

Developing the concept of "group." The word *group* is already familiar to most children because they play in groups and carry on group activities. The next step is to learn the meaning of the term as it applies to arithmetic. This concept can be developed by means of such experiences as the following:

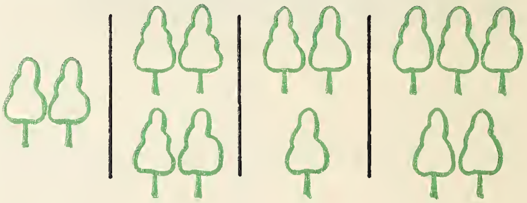
Call attention to a group of children working at a table and ask how many are in the group. Explain that there is always more than one thing in a group.

To emphasize that one is *not* a group, point out single objects, as a child working alone.

Comparing groups. Have the children compare two groups to find which has more in it, as two groups of children or two stacks of books. The concept of the larger and the smaller of two groups will follow naturally.

When these concepts have been developed, two groups with the same number of objects in them may be compared to develop the concept of equal groups.

After using actual objects, it is a good plan to provide practice with pictured materials. Groups of not more than 5 squares, circles, trees, etc., may be drawn, and the children asked to compare the groups as to size.



Using Page 4

The children probably know the words in the direction line, but it should be explained that *Tell how many* on this page means to tell how many animals there are in each picture by writing the number each time.

Have the children find the picture that shows only one elephant and write *1* on the line beside the picture. Then have them find the picture that shows more than one elephant and write the number that tells how many there are. Ask, "Which picture shows a group of elephants?" Help them discover the other groups of circus animals on the page.

Have them find the group of dancing bears, count them, and write the number. Have them count the bears in the other group and write the number. Ask which group has more bears in it. Have them draw a ring around this group. Develop the idea that this is the larger group and that the group of dancing bears is the smaller group.

Have them count each group of seals and write the number. Ask them to put an X by the smaller group of seals.

Let them discover, by counting and writing the numbers, that each of the two groups of penguins has the same number in it.

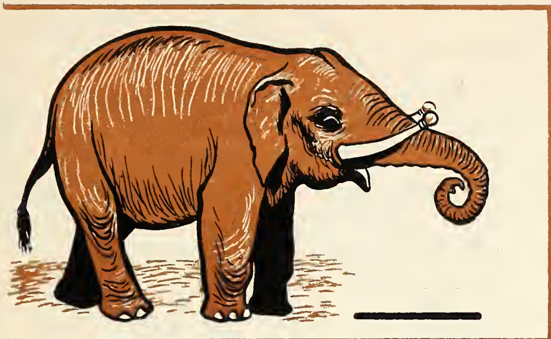
Finally, lead the children to discover that one of the groups of seals has the same number in it as one of the groups of penguins, and that one of the groups of bears has the same number in it as one of the groups of seals.

Follow-up Activities

Additional learning helps. Any children who had difficulty with page 4 should be given more experiences of the kind suggested for preparatory activities.

Enrichment activities. Those children who had no difficulty with the material on groups may draw or cut from magazines pictures of groups of 2 to 5 things.

Tell how many.



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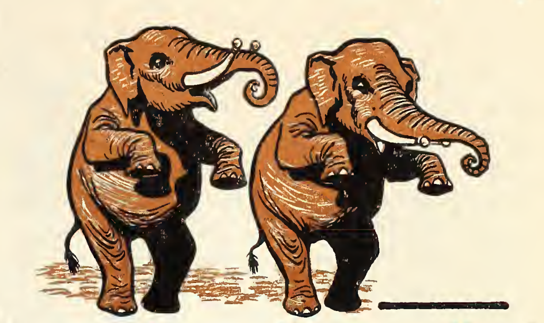

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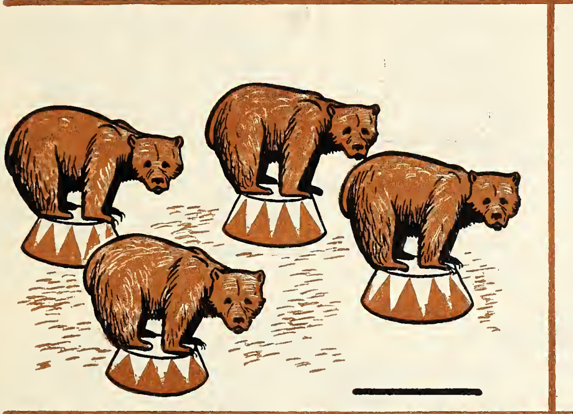

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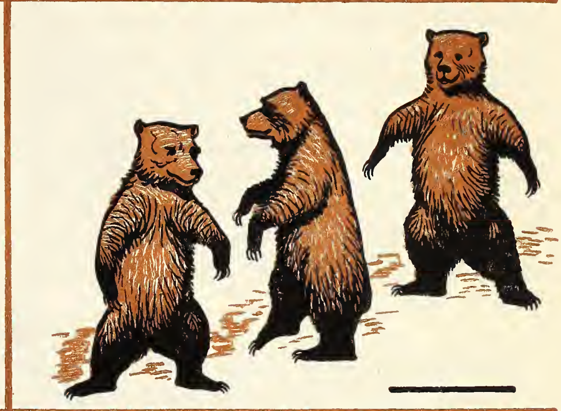

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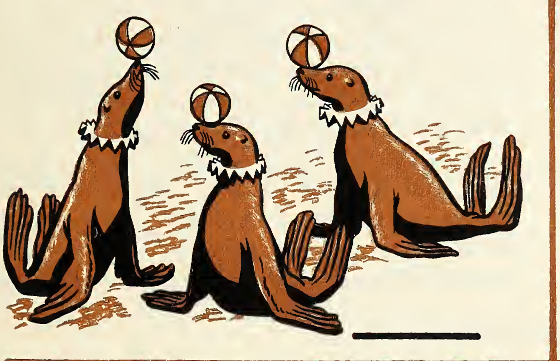

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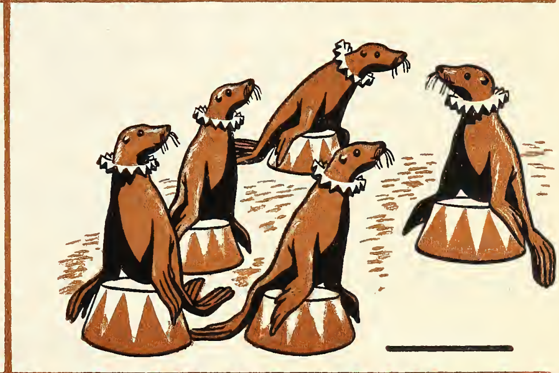

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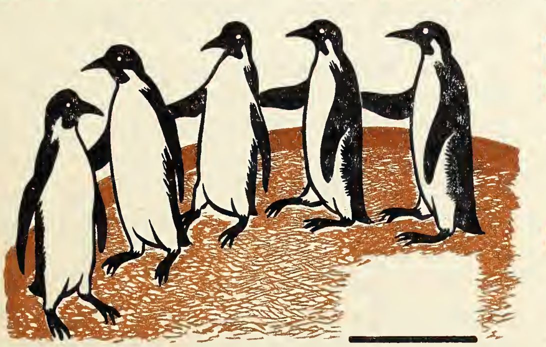

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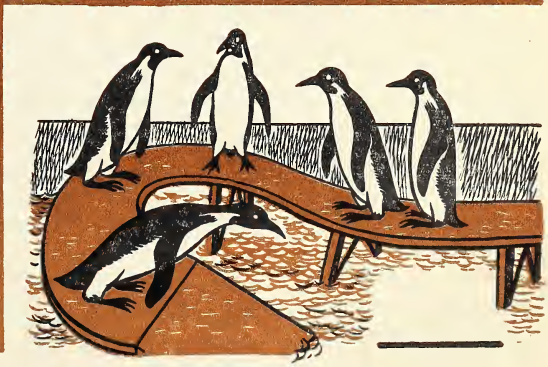

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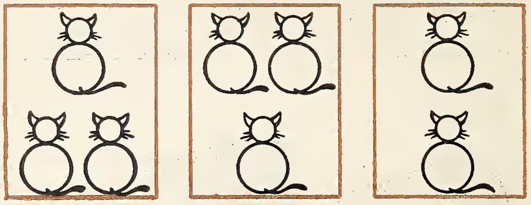
RECOGNIZING GROUPS OF TWO AND THREE

Preparatory Activities

The children are now ready for experiences with groups which will enrich their concepts of the numbers they have used in counting. They will develop the concept that numbers represent not only a series of single objects, but also groups of objects. They will discover the various subgroups which make up a larger group, such as 2 and 2 in a group of 4. These experiences also create a meaningful background for addition, since the groups parallel the addition facts which will be introduced later.

Using concrete objects. First, have the children place on their desks 2 small objects. Then have them place 1 more object just below the 2, and tell how many there are in the whole group. Next, have them place 1 object above and 2 below. Then help them to discover that the group with 2 at the top and 1 below has the same number in it as the group with 1 at the top and 2 below.

Discovering group arrangements in pictures. Draw on the blackboard rectangles with groups arranged in this way:



For each picture, have the children tell how many are at the top, how many are at the bottom, and how many are in the whole group.

Using Page 5

Help the children discover that in each picture at the top of the page some of the toy dogs are in the box and some are out of the box. Help them read the questions and find the blanks for the answers.

For each picture, ask, "How many dogs are in the box? How many are out of the box?" Have a child read the question, "How many dogs?" When the children know how many dogs are in the picture, have them write the number on the line.

For the lower half of the page, explain that the dotted lines in the first exercise show how all three of the exercises are to be done. Help the children read the first direction, and have them trace the 2 balls. Then have them read the second direction and trace the 1 ball, and finally trace the number that tells how many balls they drew. The other two exercises should be done in the same way, but without models. When all three exercises have been completed, ask the children to put an X beside each of the two boxes in which they drew the same number of balls.

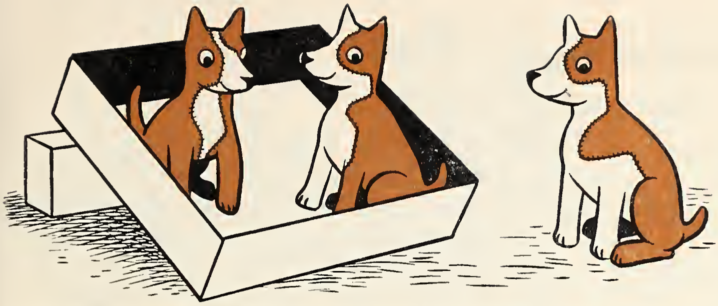
Follow-up Activities

Additional learning helps. If any of the children had difficulty with page 5, it is necessary to determine the nature of the difficulty. If it was failure to grasp the idea that a group of 3 may be made up of either 2 and 1 or 1 and 2, and that a group of 2 may be made up of 1 and 1, dramatization experiences should be provided to clarify these concepts.

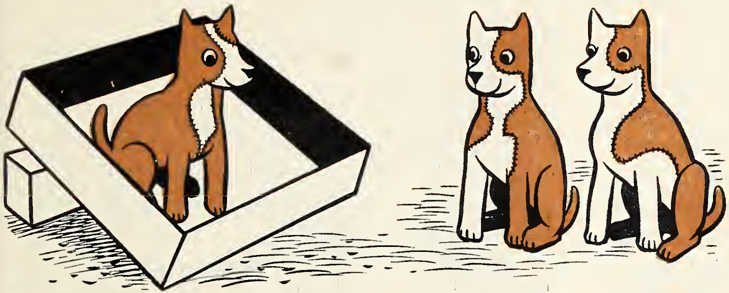
Draw a chalk ring on the floor. Have 2 children stand in the ring and have 1 child stand outside the ring. Ask the children how many there are in the whole group. Repeat this kind of dramatization for groups of 1 and 2 and 1 and 1.

Some children may have difficulty because they cannot follow directions accurately. Such children should be given help in reading and following similar directions written on the blackboard.

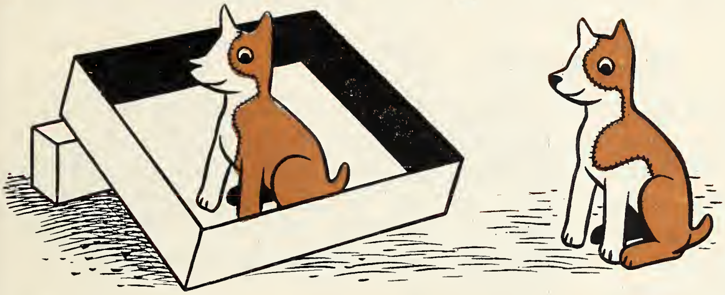
Enrichment activities. Children who had no difficulty with page 5 should not be required to participate in the additional learning activities, but should be allowed to do other things they need to do or that interest them.



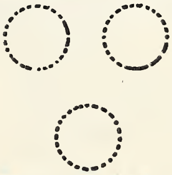
How many dogs? ____



How many dogs? ____



How many dogs? ____

Draw 2 balls. Then draw 1 more ball.		3
Draw 1 ball. Then draw 2 more balls.		____
Draw 1 ball. Then draw 1 more ball.		____

RECOGNIZING GROUPS OF FOUR

Preparatory Activities

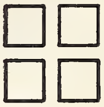
The exercises on page 6 are designed to enrich the children's understanding of the number *4* through experiences in identifying, discovering, and making groups of 4. All of the arrangements that parallel the addition facts with sums of 4 are included.

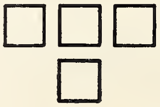
Using concrete objects. First, provide work with groups of 2, 3, and 4 objects in informal arrangement. For example, ask 2 children to stand in one group. Have 3 more children stand in another group, and 4 in a third group. The pupils then tell how many there are in each group.

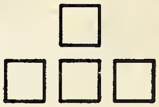
Next, work with groups of 4 objects in various arrangements and have the children tell how many are in each group. For example, hold 2 pencils in one hand and 2 in the other. Then hold 1 pencil in the right hand and 3 in the left. Next, hold 3 pencils in the right hand and 1 in the left.

Have the children put 2 blocks, or other small objects, in a row on their desks and then put 2 more below the first 2. Then have them tell how many there are in the whole group. Next, have them place 1 block on their desks and 3 below it. Then 3 at the top and 1 below.

Care should be taken to see that the groups are arranged in patterns which illustrate the addition facts about 4. These are:







Using Page 6

For each picture of dolls, ask, "How many dolls are on the bench? How many are standing? How many dolls are there?" Help the children to read the question, "How many dolls are there?" Have them write on the line the number that answers the question.

Proceed with this page as with the preceding page. In each of the last three exercises, the children should read and follow the first direction (*Draw 3 balls*) before they read and carry out the second direction (*Then draw 1 more ball*). They should then write the total number of balls they have drawn in that exercise.

Follow-up Activities

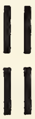
Additional learning helps. If any of the children need more help with groups of 4, kinesthetic experiences such as the following may help them.

With a pencil or stick the teacher taps 2 times and asks the children to tell how many taps they heard. Then she taps 3 times, then 4 times. Next, she taps in patterns to develop the group idea, as:

(a) Tap, tap, pause, tap, tap.
(b) Tap, pause, tap, tap, tap.
(c) Tap, tap, tap, pause, tap.

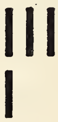
As the teacher taps, the children may make short lines to indicate the groupings they hear. They make a line for each tap they hear until there is a pause. Then under those lines they make a line for each tap they hear after the pause; for example:

(a)

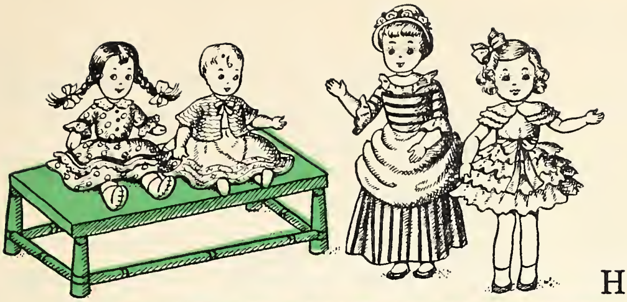


(b)

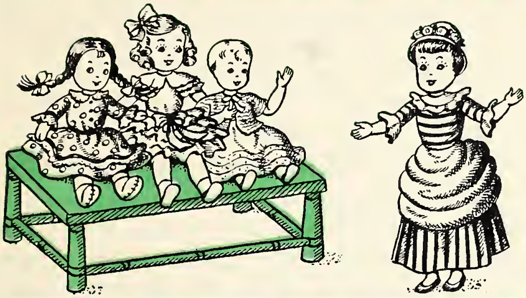
(c)



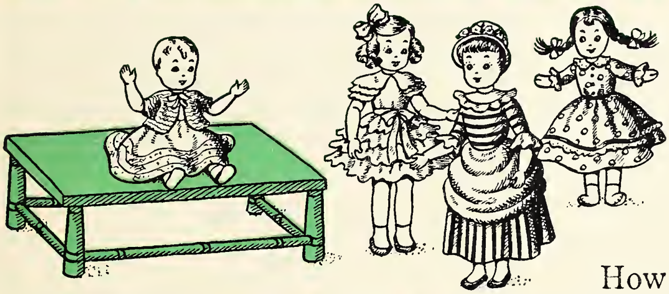
Enrichment activities. Those children who experienced no difficulty with page 6 may make pictures to show arrangements of groups of 4 to place in their arithmetic folders or scrapbooks. There are three possible arrangements, and the children will enjoy making pictures of trees, toys, and so on, to show the groups.



How many dolls are there? ____



How many dolls are there? ____



How many dolls are there? ____

Draw 3 balls. Then draw 1 more ball.	○ ○ ○ ○	4
Draw 1 ball. Then draw 3 more balls.		____
Draw 2 balls. Then draw 2 more balls.		____

LEARNING TO ADD

Those children who have completed the preceding unit successfully are ready for the telescoped reteaching of simple addition. In *Making Sure of Arithmetic,* the program for Grade One includes the addition facts with sums of 2, 3, 4, 5, and 6. In this section of the Grade Two program, these facts are retaught according to the following plan.

Dramatizing the meaning of addition. Dramatization of simple number stories is the first step in helping children gain an understanding of the meaning of addition. For example, as the teacher tells such stories as these, the children dramatize them.

Two boys were playing with airplanes. Two more boys came to play. How many boys were playing then?

Tom had 1 block. John gave him 2 more blocks. Then how many blocks did Tom have?

As the children "play" the stories, they actually see the addition taking place. They see two smaller groups, or 1 and a group, being combined to make a larger group.

The next step is a transition from actual dramatization with concrete objects to illustrations which demonstrate the meaning of addition.

The teacher interprets a pictured number story which calls for addition. At first (as in the pupil's book, page 7), each number story is illustrated by two pictures. The first picture shows the smaller groups in the act of combining. The second picture shows the larger group which results from the addition of the two smaller groups. This step parallels, in pictures, the actual dramatization of the addition process.

In the steps just described, the answer is shown realistically. However, in both the dramatization and the picture story situations, it is important that the objects used should be such that the children can *identify* the smaller groups after they have been combined into the larger group. For example, in the first number story on page 7, the girls have identity, so that in the second picture, which shows all four girls picking flowers, the children see that these are the same girls as those in the first picture and not *four more* girls.

Here the example used to develop each fact takes this horizontal form:

and are ____ girls

It is read, "Two girls and 2 girls are how many girls?" The pupils answer, "4 girls," and write *4* in the blank.

It will be noted that a *fact* differs from an *example* in that it includes the answer.

Learning addition facts. Next (as in the pupil's book, page 8), the children are given another illustrated number story using each of the facts introduced on the previous page. The teacher tells the number story orally from the picture, and the children read the question to be answered, as, "How many are 2 cows and 1 cow?" The children may "think" the two pictured groups together and answer orally, "3 cows." Then they write the answer to an example in vertical form which makes use of the new fact, as:

____ cows

The example is read, "Two cows and 1 cow are how many cows?" The pupils answer, "3 cows," and write the 3.

In presenting facts in example form, as above, the groups to be added may be illustrated, but the sum should not be illustrated.

The next step in learning an addition fact (see page 10 in the pupil's book) is the transition from the illustrated example to an example in which words represent the objects, as:

2 balls
1 ball
____ balls

The pupils think, "2 balls and 1 ball are how many balls?" They answer, "3 balls," and write the 3. This step is sometimes called the semiabstract stage in the development of addition.

Throughout the reteaching section the children think in terms of the concrete as they learn the addition facts. They think, "3 tops and 1 top are 4 tops." They are not asked to think "3 and 1 are 4" until the reteaching section has been completed. At that time the facts are given with the plus sign in this form:

$$\begin{array}{r} 3 \\ +\,1 \\ \hline 4 \end{array}$$

Using meaningful language. The words *and* and *are* are used in stating the facts because this is the most realistic and natural way of expressing addition. The language helps the children understand what they are doing. The terms *plus* and *equal* are not yet used in stating addition facts, but are introduced in Grade Three, when the children have become more mature.

Readiness for problem solving. After the pupils have learned a few of the addition facts, they are ready to use these facts in finding the answers to simple, illustrated number stories which can be stated orally. For instance, on page 11 in the pupil's book each example from a number story is stated in the form of a question without the example form, as—"How many dogs are 3 dogs and 1 dog?" This is a readiness step in developing the skills needed to read a problem and think about the mathematical situation it describes.

Another step is that in which a complete number story is presented in very simple language for the children to read. The transition to this step is made gradually. For example, on page 16 in their books the children first read only the questions in number stories given orally by the teacher. Then simple, but complete, illustrated number stories are provided. The children read the stories and answer the questions asked.

Up to this point, all of the number stories are illustrated and all are of the type in which the act of adding can be dramatized or visualized.

On pages 21 and 22 there is a definite step-up in readiness for reading and solving problems.

At the top of page 21 a number of static pictures of toys the children have made are provided. The teacher tells number stories about these toys; for example: "Sue made 5 doll hats. Ruth made 1 hat. How many hats did the girls make?" The children write the answer. For the first time, neither the oral number stories nor the pictures involve action.

On page 22 the children are given very simply stated number stories (problems) to be read. All of them require addition for solution, but the stories involve situations in which the combining or coming together of two groups is not described or illustrated. For example:

John made 3 cows. Bob made 3 cows. How many cows did the boys make?

With these first nonaction addition situations, the pupils are encouraged to make their own pictures of the objects to be added.

The steps in learning to read and solve problems outlined above, and others which follow as part of the reteaching of subtraction, constitute a planned readiness program for developing the skills needed in reading and solving problems.

The first step in problem solving after readiness has been developed comes after the addition and subtraction processes have been brought together and the relationship between the processes has been learned. At that time the children will need to decide which process to use in answering the questions in number stories. This step is introduced after the reteaching section has been completed.

Learning about the fraction one-half; practice with numbers 1 to 10. Other topics included in this section are the fraction *one-half* and a maintenance exercise on the numbers *1* to *10*.

Making Sure tests. A "Making Sure" test on the fraction *one-half*, the numbers and number words *one* to *ten*, and the 15 addition facts taught thus far is presented on page 23.

INTRODUCTION TO ADDITION

Preparatory Activities

Pages 7 and 8 serve two purposes: (1) they help the children take the semiconcrete step in learning what addition means; and (2) they introduce three addition facts: 2 and 2 are 4, 2 and 1 are 3, and 1 and 2 are 3.

Demonstrating addition concretely. Before the pupil's book is used, the children should have concrete experiences which will enable them to visualize the facts they are to learn.

Have the children dramatize a story which uses the example 2 and 2, and which calls for addition, as: "Two girls were reading books at the reading table. Two more girls came to read. How many girls were reading then?"

The dramatization will enable the children to see (1) the two smaller groups which are to be added, (2) the combining take place, (3) the larger group which results from the addition.

The addition fact should be stated for the children after it is dramatized: "2 girls and 2 girls are 4 girls."

At this time, the children should be given a very simply stated oral definition of addition, as:

"We add when we put things together and find how many there are in all. When we think 2 girls and 2 girls are 4 girls, we are adding."

Building addition facts with concrete objects. Next, the children should use concrete objects such as counting blocks or buttons to build the fact. For example, they may put 2 blocks on their desks, then put 2 more blocks below them. Have them put the blocks together and tell how many there are in all.

The teacher should write the example on the blackboard in this form:

2 ■ ■
2 ■ ■
____
___ blocks

One child may be asked to write the answer, and another to read the fact.

The same procedure may be followed in introducing the other two facts, using for dramatization stories such as the following:

Two books were on the table. Tom put 1 more book on the table. How many books were on the table then?

One boat was sailing on the lake. Two more boats came. Then how many boats were sailing?

The children will have no difficulty pretending they are cars, or boats, or airplanes when dramatizing number stories.

Using Page 7

Ask the children to look at the two pictures at the top of the page. Explain that the picture on the left tells the number story and the one on the right shows the answer. It must be made perfectly clear that the girls in the second picture are the same four girls as those in the first picture, and *not* four more girls. Tell a number story about the pictures, as:

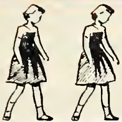
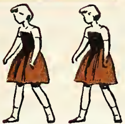
One day 2 girls were picking flowers in the woods. Two more girls came to pick flowers. Then how many girls were picking flowers?

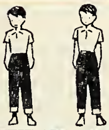
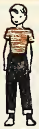
Next, have the children read the example under the pictures in this way: "Two girls and 2 girls are how many girls?" When they know the answer, have them give it orally and then write the *4* in the blank.

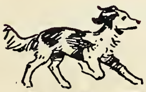
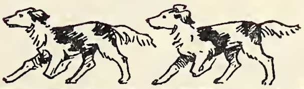
The same procedure should be followed for the other pictures on the page, with such stories as these:

Two boys were walking on a log. One more boy came to walk on the log. How many boys were walking on the log in all?

One day a dog was barking at a squirrel in a tree. Two more dogs came to the tree. How many dogs were barking at the squirrel then?

 and  are _____ girls

 and  are _____ boys

 and  are _____ dogs

Introduction to Addition (continued)

Using Page 8

Page 8 is a practice page and should be used the day after the facts have been introduced on page 7.

Tell the children that the picture at the top of the page illustrates the following number story:

Two cows were drinking at a brook. One more cow came to drink. Then how many cows were drinking?

Have the children read the question under the picture and answer it orally. Then have them trace the dotted numbers in the example at the right and write the answer in the blank.

Follow the same procedure for the second and third pictures, except that in the third exercise the children are to write the example without a model. Careful supervision will be needed as the children complete the third example. Be sure that they understand that the numbers are to be written in the order in which they come in the question: 1, then 2. These stories may be used:

Two ponies were standing in the shade under a tree. Two more ponies came to stand under the tree. How many ponies were under the tree in all?

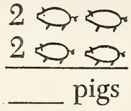
One pig was eating from a trough. Two more pigs came to eat. How many pigs were eating then?

Various ways of stating the question in the number stories have been suggested. This is to help the children think about the situation in the problem rather than look for words that will give them a cue as to how to find the answer. Also it helps them to become familiar with the language common to the addition process.

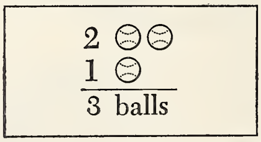
The children probably can read the direction line at the bottom of the page because all of the words are familiar. However, they should be given an explanation of its meaning here. It means that for each example they are to think how many balls there are in all and write the number that tells the answer.

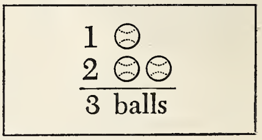
Follow-up Activities

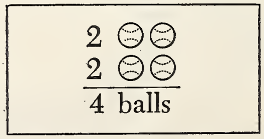
Additional learning helps. Any children who had difficulty with these first steps in learning to add should be given additional experiences with dramatization and with concrete objects. Following these experiences, the teacher may ask them to make up and tell number stories using the facts. Sometimes telling the stories themselves helps children think through the situations better than listening to stories told by someone else. The teacher may illustrate each example on the blackboard and let the children write the answer to complete the fact. For example:



These same children will probably need help in remembering the facts after they are learned. A set of illustrated study and practice cards will be very useful to them. The teacher may help them to make a card for each of the facts that was just introduced; for example:

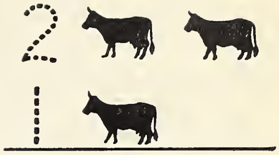




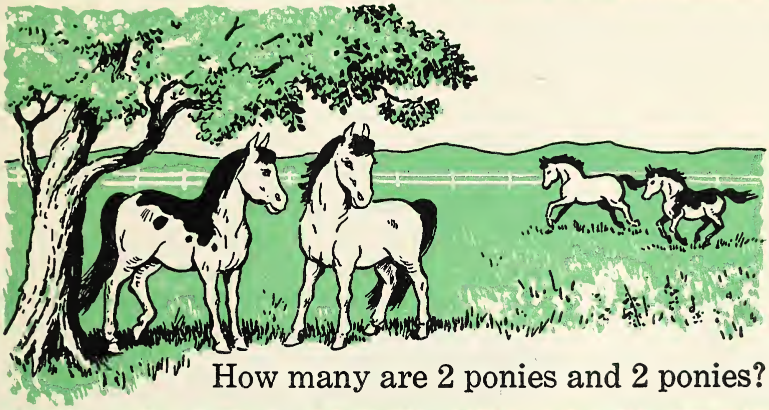


Enrichment activities. The children who need no additional help at this time may enjoy making and illustrating number stories using the facts. Or they may make cards for the facts, as suggested above, for the arithmetic game table.

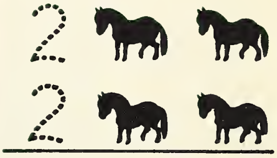
How many are 2 cows and 1 cow?



____ cows

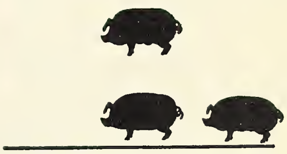


How many are 2 ponies and 2 ponies?



____ ponies

How many are 1 pig and 2 pigs?



____ pigs

Tell how many there are in all.

2 ◐◐
1 ◐

____balls

2 ◐◐
2 ◐◐

____balls

1 ◐
2 ◐◐

____balls

LEARNING THREE MORE ADDITION FACTS

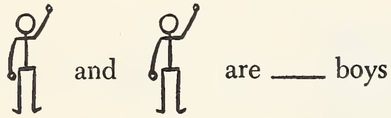
Preparatory Activities

The purpose of the picture stories and the illustrated examples on page 9 is to introduce three new addition facts: 1 and 1 are 2, 3 and 1 are 4, and 1 and 3 are 4.

Dramatization. Tell the children any number story that can be dramatized and that uses the fact 1 and 1 are 2, as:

One boy was drawing at the blackboard. One more boy came to draw. How many boys were drawing then?

After the children have dramatized the story, put the example on the blackboard with pictures and words.



The children should read the example, "One boy and 1 boy are how many boys?"

The numbers 3, 1, and 4 are used in two related addition facts: 3 and 1 are 4 and its reverse, 1 and 3 are 4. A story using the fact 3 and 1 are 4 should be told and dramatized, as:

Three books were on the reading table. John put 1 more book on the table. How many books were on the table in all?

After the example has been put on the blackboard and the children have read it and found the answer, a number story using the second of the related facts (1 and 3 are 4) should be told and dramatized, as:

One book was on the reading table. Mary put 3 more books on the table. How many books were on the table then?

By using the same objects for the two dramatizations, the children will more easily sense the relationship between the facts 3 and 1 are 4 and 1 and 3 are 4.

Building facts with concrete objects. The children should now be helped to build the three facts on their desks with concrete objects. The examples should be put on the blackboard with pictures to illustrate them, and different children should be asked to write the answers.

Using Page 9

Follow the same procedure for page 9 that was suggested for page 7, using these or similar stories:

One duck was swimming on a pond. One more duck came to swim. How many ducks were swimming then?

Three rabbits were eating carrots. One more rabbit came into the garden. How many rabbits were eating carrots then?

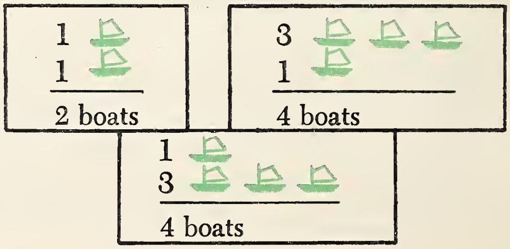
One kitten was playing with a ball of yarn. Three more kittens came to play. Then how many kittens were playing?

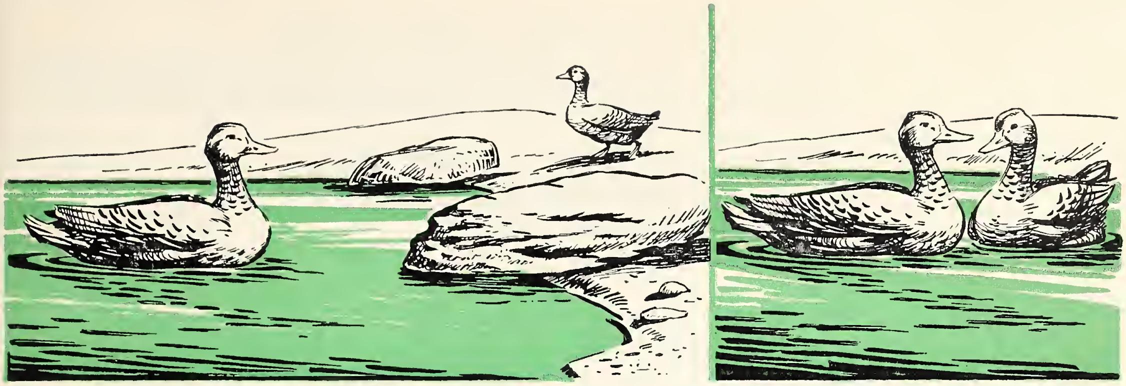
Have the children read each example and write the answer in the blank.

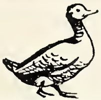
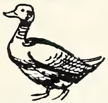
Follow-up Activities

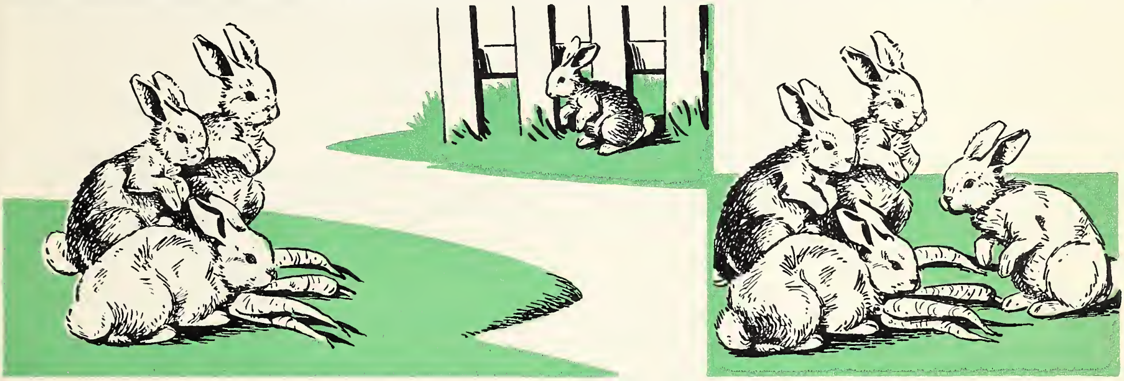
Additional learning helps. One of the most effective ways to help children who experience difficulty in understanding the facts is to have them draw pictures to illustrate each fact. Also, have them make a card for each new fact, to be used for further study, as suggested on page 32.

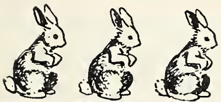
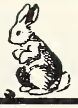
Enrichment activities. If some of the faster learners are making sets of cards for the game table, have them add the three new facts to the collection. The cards may be illustrated this way:

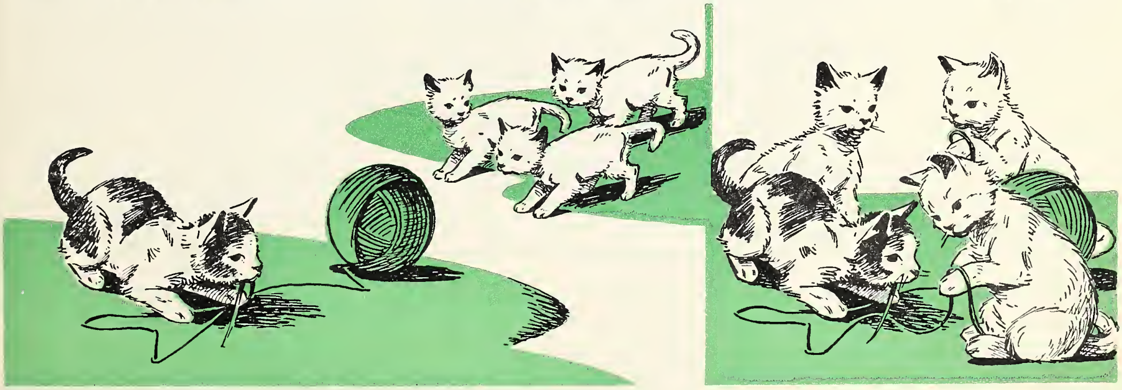


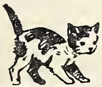
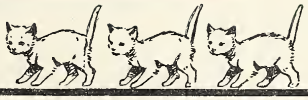


 and  are ______ ducks



 and  are ______ rabbits



 and  are ______ kittens

USING FACTS IN STORIES AND EXAMPLES

Preparatory Activities

The purpose of page 10 is to give the pupils practice with the three new facts they learned on page 9. At this time the transition is made to examples in vertical form, with words instead of pictures to tell what the numbers represent.

Demonstrating example forms. To make sure that the children understand how to read and write examples in vertical form with words instead of pictures to tell what is being added, write several questions and incomplete examples on the blackboard, as:

How many are 3 dolls and 1 doll?
dolls
doll
___ dolls

How many are 1 duck and 1 duck?
duck
duck
___ ducks

How many are 1 cow and 3 cows?
cow
cows
___ cows

The children should be helped to understand that words as well as pictures can tell what is being added.

Explain to the children that they are to write the numbers beside the words in each example in the order in which they come in the question. This can be demonstrated as many times as necessary.

Using Page 10

Tell a number story for the first picture. Have the children read the question and answer it orally. Have them trace the numbers in the example and write the answer.

The same procedure should be followed for the next two pictures, except that the children are to write the numbers in the examples without the aid of dotted lines. Careful supervision will be needed to see that they write *1* and *1* beside the words *wagon* and *wagon* and *1* and 3 beside the words *boat* and *boats.*

Following are some stories which may be used in interpreting the pictures:

Three airplanes were on the ground. One more airplane landed. Then how many airplanes were on the ground?

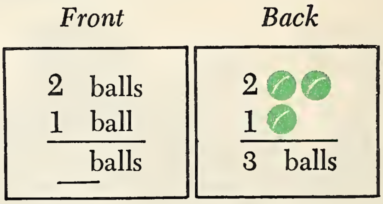
One wagon was in the corn field. A farmer drove one more wagon into the field. How many wagons were there in all?

One boat was tied up to the pier. Three more boats sailed up to the pier. How many boats were at the pier then?

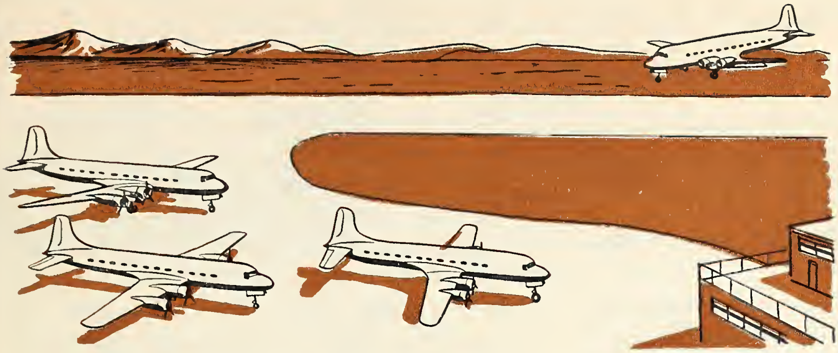
The children may need help in reading the question, "How many are there in all?" at the bottom of the page. When the direction is clear, the children should add and write the answers for the examples.

Follow-up Activities

Additional learning helps. If some of the children had difficulty with the exercises on page 10, their work should be studied carefully to determine the cause of the difficulty. Some may need help in writing the numbers in the examples. Others, who have not learned the facts, will need more experiences with concrete objects and practice with the facts cards. The teacher may help them to make a card for each of the facts, using pictures on one side and words on the other to show what is being added.

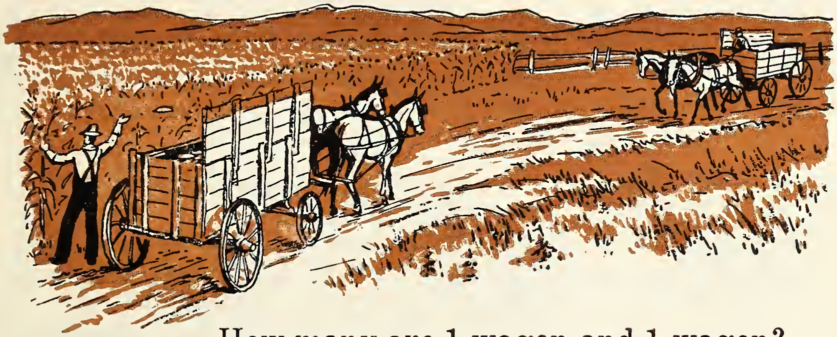


Enrichment activities. The children who had no difficulty with page 10 may enjoy drawing pictures to illustrate number stories using the new facts and others learned previously.



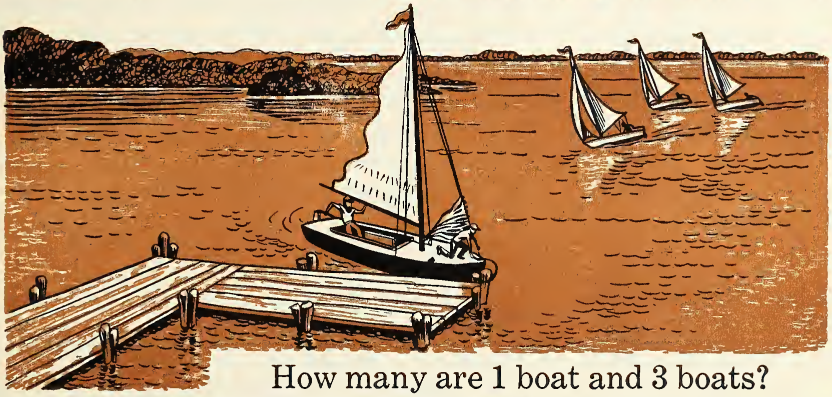
3 airplanes
1 airplane

How many are 3 airplanes and 1 airplane? ____ airplanes



wagon
____ wagon

How many are 1 wagon and 1 wagon? ____ wagons



boat
____ boats

How many are 1 boat and 3 boats? ____ boats

How many are there in all?

3 pigs	1 cow	1 doll	2 kittens	1 duck
1 pig	2 cows	1 doll	2 kittens	3 ducks
____pigs	____cows	____dolls	____kittens	____ducks

USING FACTS IN ILLUSTRATED NUMBER STORIES

Preparatory Activities

Page 11 in the pupil's book presents number stories (problems) which call for the use of facts the children have learned. The purpose is to help children understand the problem situation and visualize the completed action in the story.

Dramatizing number stories. Dramatization will help the children with this learning step. However, the action in the number story should not be completed in the dramatization because the children must learn to do the kind of thinking required in problem solving, which is to *think* what the result will be when the action is completed. For example, tell a number story, as:

One girl was reading at the library table. Three more girls came to read. How many girls were reading then?

In the dramatization, 1 girl is reading at a table, and 3 girls are coming to read. Stop the dramatization before the 3 girls join the 1 girl. Ask, "How many girls will be reading when the 3 other girls are there? How many girls are 1 girl and 3 girls?"

The children will *think* the answer and then give it.

Tell number stories using other facts that have been learned, and have the children dramatize the stories as suggested above, stopping before the answer is shown.

Using Page 11

Tell a number story about each picture of the dog show—or let different children tell the stories. The stories may be told in the children's own words, or these stories may be used:

One day some children went to a dog show. Three dogs were walking on their forepaws. One more dog came to walk on his forepaws, too. Then how many dogs were doing this trick?

One dog was jumping through a hoop. One more dog came to jump. How many dogs jumped through the hoop?

One dog was dancing in the ring. Three more dogs came to dance. How many dogs were dancing then?

Two dogs were walking on wires. One more dog came to walk on the wires. How many were walking on the wires in all?

Two dogs were turning somersaults. Two more dogs came. How many dogs were turning somersaults then?

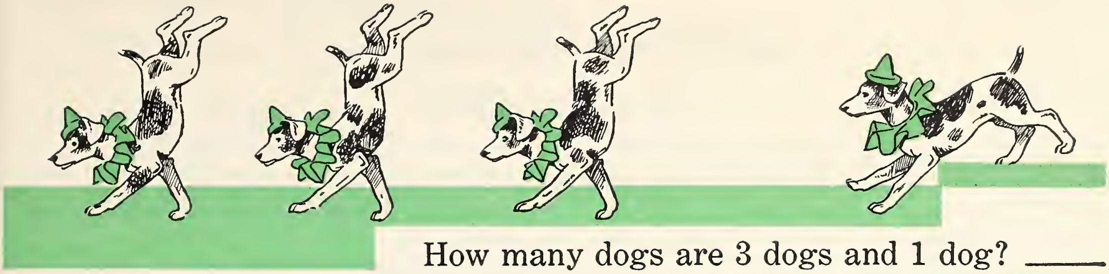
The pupils read in their books, in the form of a question, the example that comes from the number story, as, "How many dogs are 3 dogs and 1 dog?" They write the answer. This experience helps them to think through the mathematical situation in the problem.

Follow-up Activities

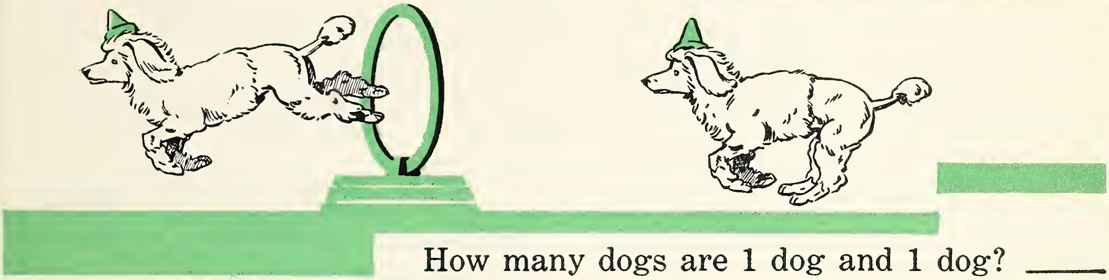
Additional learning helps. If some of the children experienced difficulty with the exercises on page 11, it is important to find what caused the difficulty. Those who did not know the addition facts should be given additional practice with concrete objects and the facts cards. Those who did not understand what they were to do should be given special help in understanding and following oral directions.

In the case of children who were unable to visualize the completed action, dramatization of the stories will probably help them. The dramatizations should, of course, be stopped before the answer is shown so the children will have an opportunity to *think* the answer. If they cannot do so, the dramatization may be continued to complete the action.

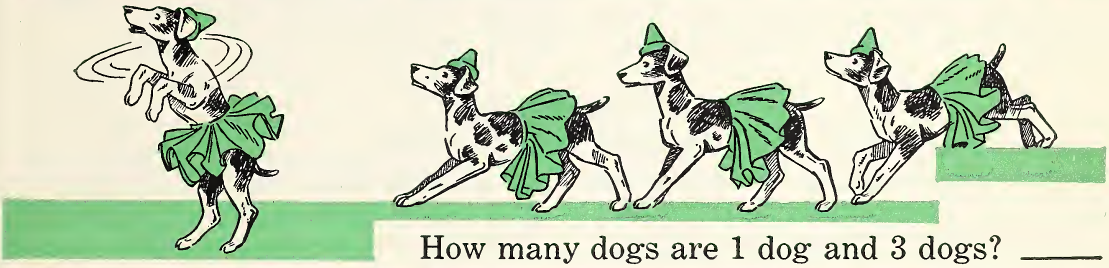
Enrichment activities. An interesting activity for the children who had no difficulty with the exercise is making stick puppets which can be used to "play" number stories made up by the children. An orange crate or a carton will serve as a stage, and the puppets may be cut from paper and attached to sticks.



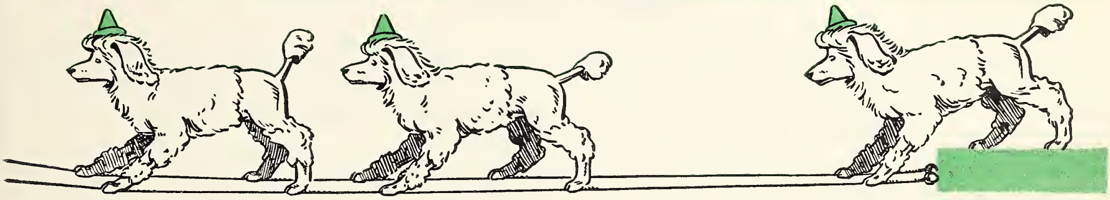
How many dogs are 3 dogs and 1 dog? ____



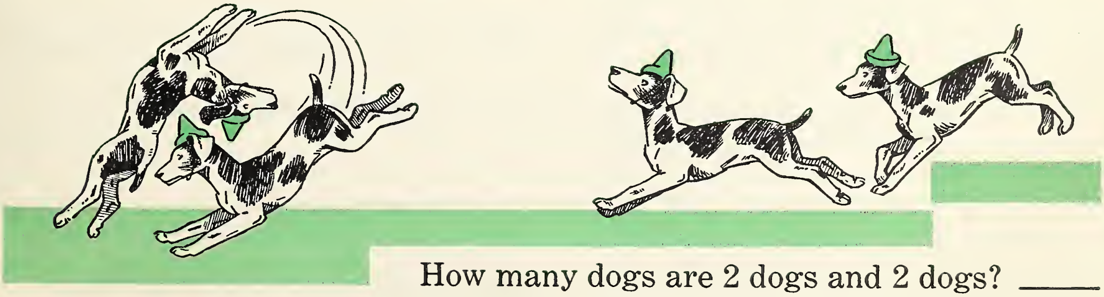
How many dogs are 1 dog and 1 dog? ____



How many dogs are 1 dog and 3 dogs? ____



How many dogs are 2 dogs and 1 dog? ____



How many dogs are 2 dogs and 2 dogs? ____

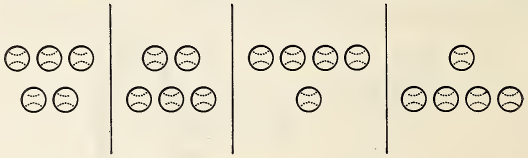
RECOGNIZING GROUPS OF FIVE

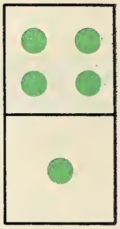
Preparatory Activities

The children are now ready to learn more about the number 5. The exercises on page 12 will help them to understand all of the possible arrangements that parallel the addition facts with sums of 5.

Using concrete objects. The teacher will first help the children identify groups of 5 without attention to the small groups that make up the groups of 5. Among the groups with which they work may be some of 2, 3, and 4. The teacher may ask the children to find the groups that are smaller than 5 and to find a group that is larger than 4. This will help to strengthen their understanding of 5 as a larger group.

The same procedure suggested on pages 24 and 26 of this book for groups of 2, 3, and 4 may be used for discovering and making groups of 5 in patterned arrangements with concrete materials. Care should be taken to see that the experiences include all of these arrangements:





The domino arrangement, such as that shown at the right, is not used because it may suggest column addition rather than simple addition. For example, the children may see 2 and 2 and 1 rather than the desired 4 and 1.

Using Page 12

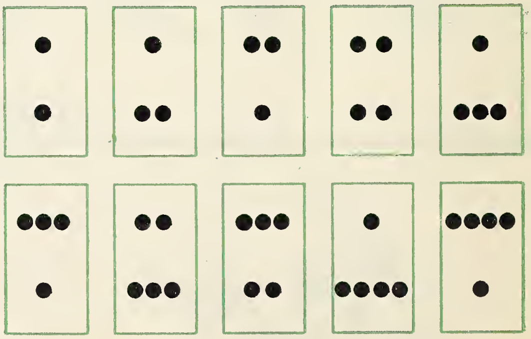
For each picture, ask, "How many cakes are on the plate? How many are not on the plate? How many cakes are there?" When the children know how many cakes there are, they write the answer in the blank. The exercise in drawing groups of balls should be easy for the children, since it follows the same plan used on preceding pages.

Follow-up Activities

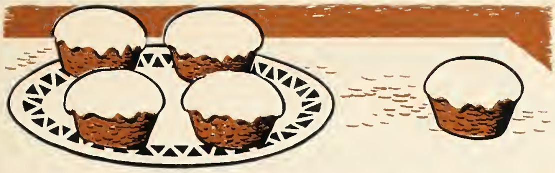
Additional learning helps. If some of the children need more help in learning about groups of 5, they should be given additional experiences with concrete materials and dramatization.

The chances are that children who have difficulty with recognizing and building groups are slow learners who may need to return often to experiences with groups as they begin the work with addition. For this reason, it may be profitable for them to make sets of practice cards which they can use as the need arises.

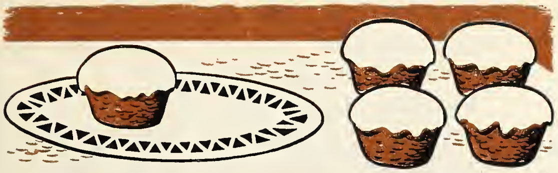
Since ten group arrangements have been introduced, each child would need to make ten cards. These may be 4″ x 6″ or 9″ x 12″ pieces of cardboard or art paper. Each child may draw dots, circles, squares, or triangles on the cards as directed by the teacher. The pictured group should be made on one side of the card and the number of objects in the group written on the back of the card. The groups should be arranged this way:



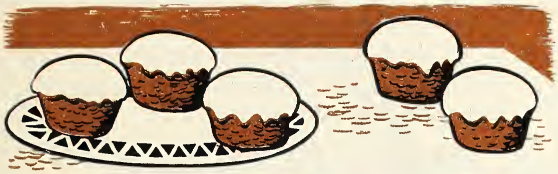
Enrichment activities. Those children who had no difficulty with the exercises on page 12 may make pictures of groups of 5 for their scrapbooks or arithmetic folders.



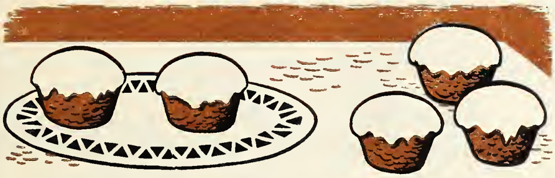
How many cakes are there? _____



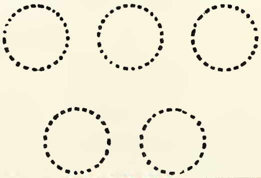
How many cakes are there? _____



How many cakes are there? _____



How many cakes are there? _____

Draw 3 balls. Then draw 2 more balls.		5
Draw 2 balls. Then draw 3 more balls.		_____
Draw 4 balls. Then draw 1 more ball.		_____
Draw 1 ball. Then draw 4 more balls.		_____

LEARNING MORE ADDITION FACTS

Preparatory Activities

The purpose of page 13 is to introduce the following four addition facts: 4 and 1 are 5, 1 and 4 are 5, 3 and 2 are 5, 2 and 3 are 5. Only one picture is used to illustrate each fact. The pupils discover the fact for themselves, since the second picture showing the answer is purposely discontinued at this point.

Dramatization. The children should first discover each of the four new facts through dramatization of stories such as these:

Four boys were passing crayons to the children. One more boy came to help. How many boys were passing crayons in all? How many are 4 boys and 1 boy?

One girl was making a poster. Four more girls came to help. How many girls were making the poster then? How many are 1 girl and 4 girls?

Tom put 3 books on the teacher's desk. Fred put 2 more books on the desk. Then how many books were on the desk? How many are 3 books and 2 books?

John made a train with 2 cars. Bob brought 3 more cars for the train. How many cars were in the train in all? How many are 2 cars and 3 cars?

Building facts with concrete objects. Next, help the children to build each fact with blocks, crayons, or other small objects. For example, direct the children to put 4 blocks on their desks, then have them put 1 more block on their desks and tell how many there are in all. Write the fact on the blackboard in these two forms:

4 blocks and 1 block are 5 blocks

$$\begin{array}{r} \text{4 blocks} \\ \underline{\text{1 block}} \\ \text{5 blocks} \end{array}$$

These facts should then be built in the same way: 1 and 4 are 5, 3 and 2 are 5, 2 and 3 are 5.

Using Page 13

After a number story is told for each picture, the pupils answer the question in the story. Then they read the incomplete statement of the fact and write the number in the blank. These, or similar, stories may be used:

Bob was playing with 4 of his pet rabbits. One more rabbit came to play. Then how many rabbits were there?

One kitten was drinking milk. Four more kittens came to drink milk. How many kittens were drinking then?

Three hens were eating grain that had spilled from a truck. Two more hens came to eat the grain. How many hens were eating in all?

Two cows were standing under a straw stack. Three more cows came. How many cows were under the straw stack then?

Follow-up Activities

Additional learning helps. If the slower learners need more help with the addition facts with sums of 5, they should receive individual help as suggested below.

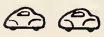
Ask the children to tell and dramatize number stories that use the facts.

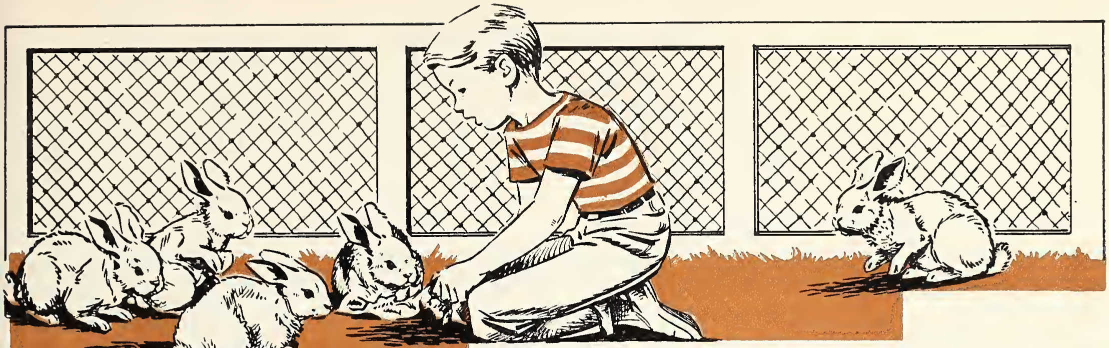
Tell the children a story using a fact. Then have them make pictures to illustrate the story. For example:

Tom made 4 houses. Alice made 1 house. How many houses did they make in all?

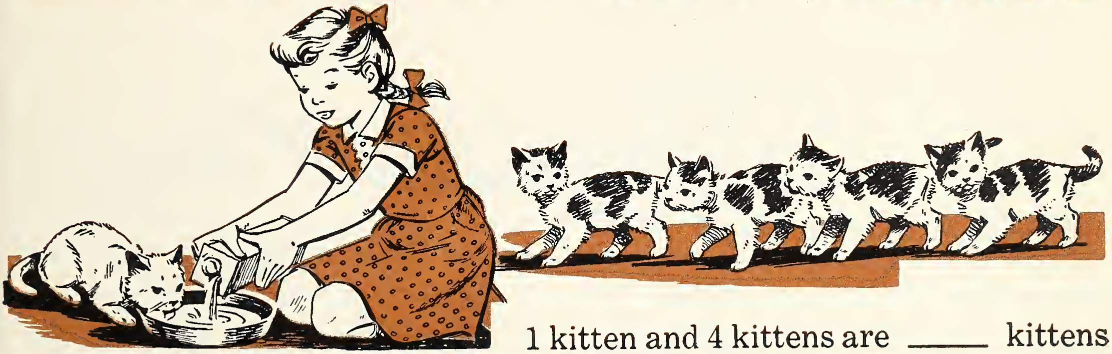
and are 5 houses

Bob made 2 cars and Bill made 3 cars. How many cars did they make altogether?

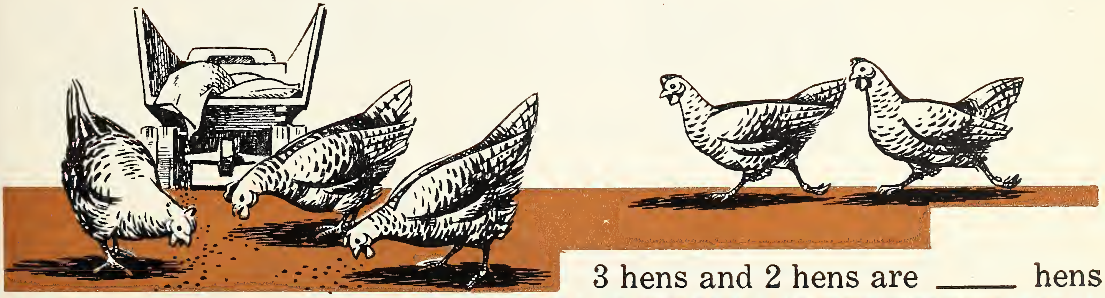
 and are 5 cars



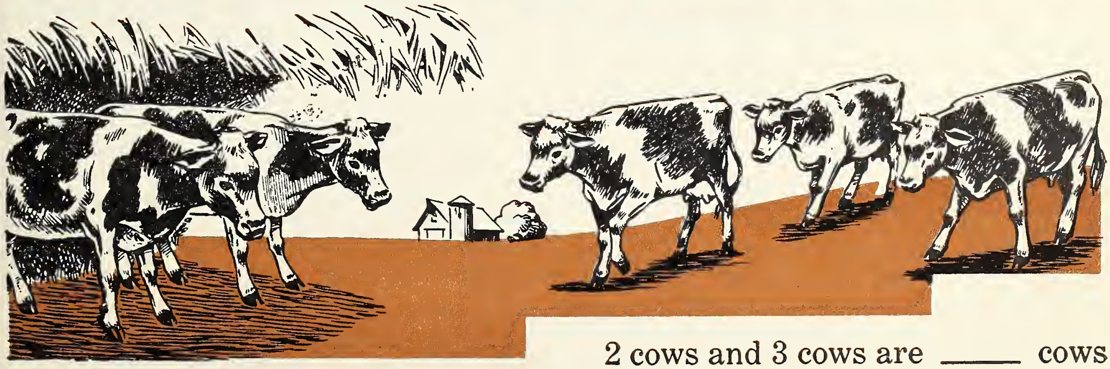
4 rabbits and 1 rabbit are _____ rabbits



1 kitten and 4 kittens are _____ kittens



3 hens and 2 hens are _____ hens



2 cows and 3 cows are _____ cows

USING ADDITION FACTS

Preparatory Activities

Page 14 provides experience in using the four new facts introduced on page 13. First, the pupils use the new facts to solve pictured number stories. As part of this experience, they write the facts in vertical form. At the bottom of the page the same facts, and one learned earlier (1 and 3 are 4), are practised again in examples.

Dramatizing number stories. The children may tell and dramatize number stories that use these facts: 4 and 1 are 5, 2 and 3 are 5, 1 and 4 are 5, 3 and 2 are 5.

Each dramatization should be stopped before the action is completed. This gives the children an opportunity to think what the answer will be.

The incomplete statement of the fact from each story should be written as a question, and followed by the complete fact in vertical form. For example, with this story—"Four cars crossed a bridge. Then 1 more car crossed the bridge. How many cars crossed in all?"—the question and the fact should be written this way:

4 cars
1 car
How many are 4 cars and 1 car? 5 cars

Using Page 14

After hearing or telling a number story for each picture, the pupils read the question and answer it orally, write the numbers in vertical example form, then write the answer. They should be reminded again to write the numbers in the example in the order in which they are given in the question.

The following stories may be used:

Four ponies are tied to the rail. Tom is bringing 1 more pony. How many ponies are there in all?

Two chickens were drinking water. Three more chickens came to drink. How many chickens were drinking then?

One pig went into the pig house. Then 4 more pigs went into the house. How many pigs went into the house in all?

Three ducks were standing beside the water. Two more ducks came. How many ducks were by the water then?

Help the children to read the direction line above the row of examples at the bottom of the page. Have them add, and write the answers for the examples.

Follow-up Activities

Additional learning helps. If some of the children had difficulty with the exercises, the teacher will wish to study their work to find what caused the trouble. If it was inability to follow directions, it will be helpful to go over the exercises with them and help them to follow step by step exactly what they were supposed to do. If they did not know the addition facts, they should be helped to build the facts with concrete materials as suggested earlier in this book.

Following these experiences, the children may be given examples such as the following, which use words that the children can read. The examples may use the four facts having sums of 5, together with other facts which have been studied and learned earlier in the program.

3 balls
2 balls
____ balls

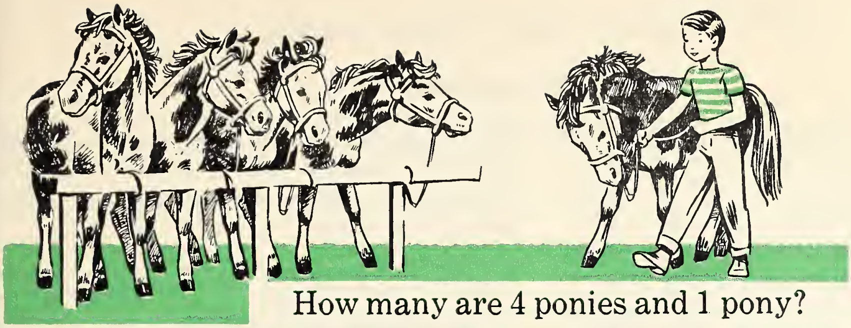
1 airplane
4 airplanes
____ airplanes

2 dolls
3 dolls
____ dolls

1 boat
3 boats
____ boats

4 wagons
1 wagon
____ wagons

Enrichment activities. The children who do not need additional help may make an illustrated card for each of the facts about 5. (See page 36.) Children who need further help may use these cards for practice.

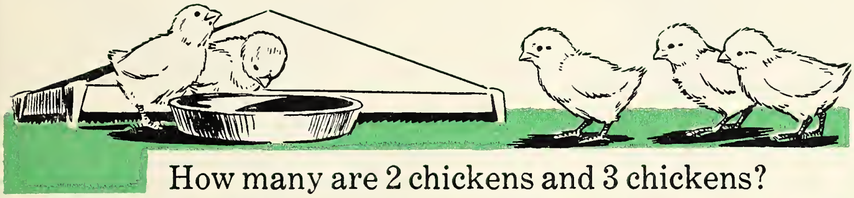


How many are 4 ponies and 1 pony?

ponies

_____ pony

_____ ponies

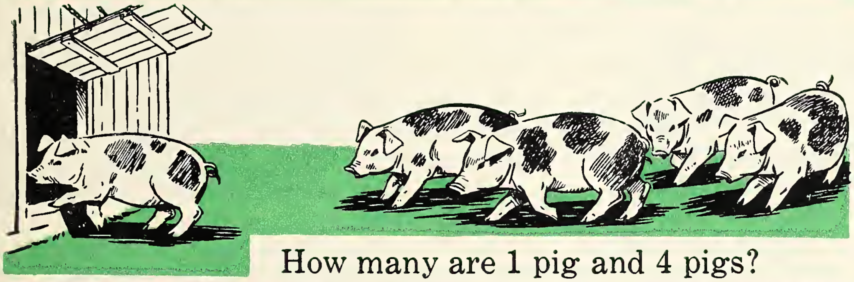


How many are 2 chickens and 3 chickens?

chickens

_____ chickens

_____ chickens

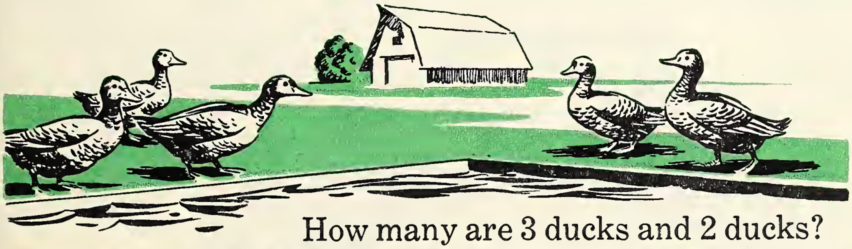


How many are 1 pig and 4 pigs?

pig

_____ pigs

_____ pigs



How many are 3 ducks and 2 ducks?

ducks

_____ ducks

_____ ducks

Tell how many there are in all.

3 dogs	1 ball	1 doll	2 wagons	4 airplanes
2 dogs	4 balls	3 dolls	3 wagons	1 airplane
_____dogs	_____balls	_____dolls	_____wagons	_____airplanes

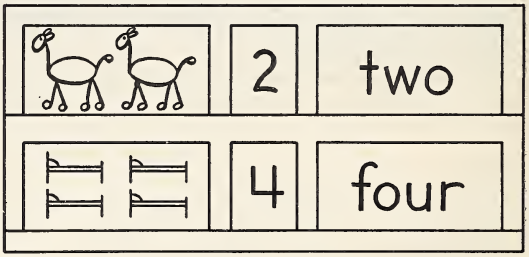
USING NUMBERS AND NUMBER WORDS

Preparatory Activities

Page 15 provides maintenance in reading and writing numbers and in reading number words to 10. Three of the number words are used in problems on page 16; the others will occur more and more frequently in problems on subsequent pages. Consequently, it is important for the teacher to make sure at this time that the children can read all of the number words without difficulty.

The number chart made earlier (see page 18) may be used again at this time for practice on the numbers and number words.

Playing a matching game. If a wall chart with pockets is available, a matching game may be played with the three sets of cards as described under additional learning helps on page 20 of this book. The picture cards are placed in the chart in miscellaneous order, and the children place beside them the matching number word cards and number symbol cards.



If the pocket chart is not available, the game may be played by arranging the cards on a bulletin board or the chalk ledge.

Using Page 15

Explain to the pupils that they are to read each number word at the top of the page and write the number it says on the blank below the word. Emphasis should be placed on neat and correct writing of the symbols.

Next, the children find how many toys there are in each group and write the number on the line provided. Then they are to read each number word in the centre of the page, and draw a line from the word to the picture that shows the same number of toys. Have them trace the dotted line from the word *three* to the picture that shows the group of 3 covered wagons to help them understand the procedure.

In the squares at the bottom of the page, the children are to write the numbers from 1 to 10 in sequence.

Follow-up Activities

Additional learning helps. If any of the children are unable to read the number words or to write the symbols correctly, they should be given individual help. Careful evaluation of each pupil's work will show just what mistakes are being made, and the kind of help the pupil needs.

A set of reference cards such as those suggested below will be helpful to those children who have not learned to recognize the number words *one* to *ten*. Each child who needs further help may make an individual set of small cards for his own use, or the teacher may make one large set which can be prominently displayed for easy reference in the classroom. In either case, both the number word and the symbol should appear on each of the ten cards.

one 1

six 6

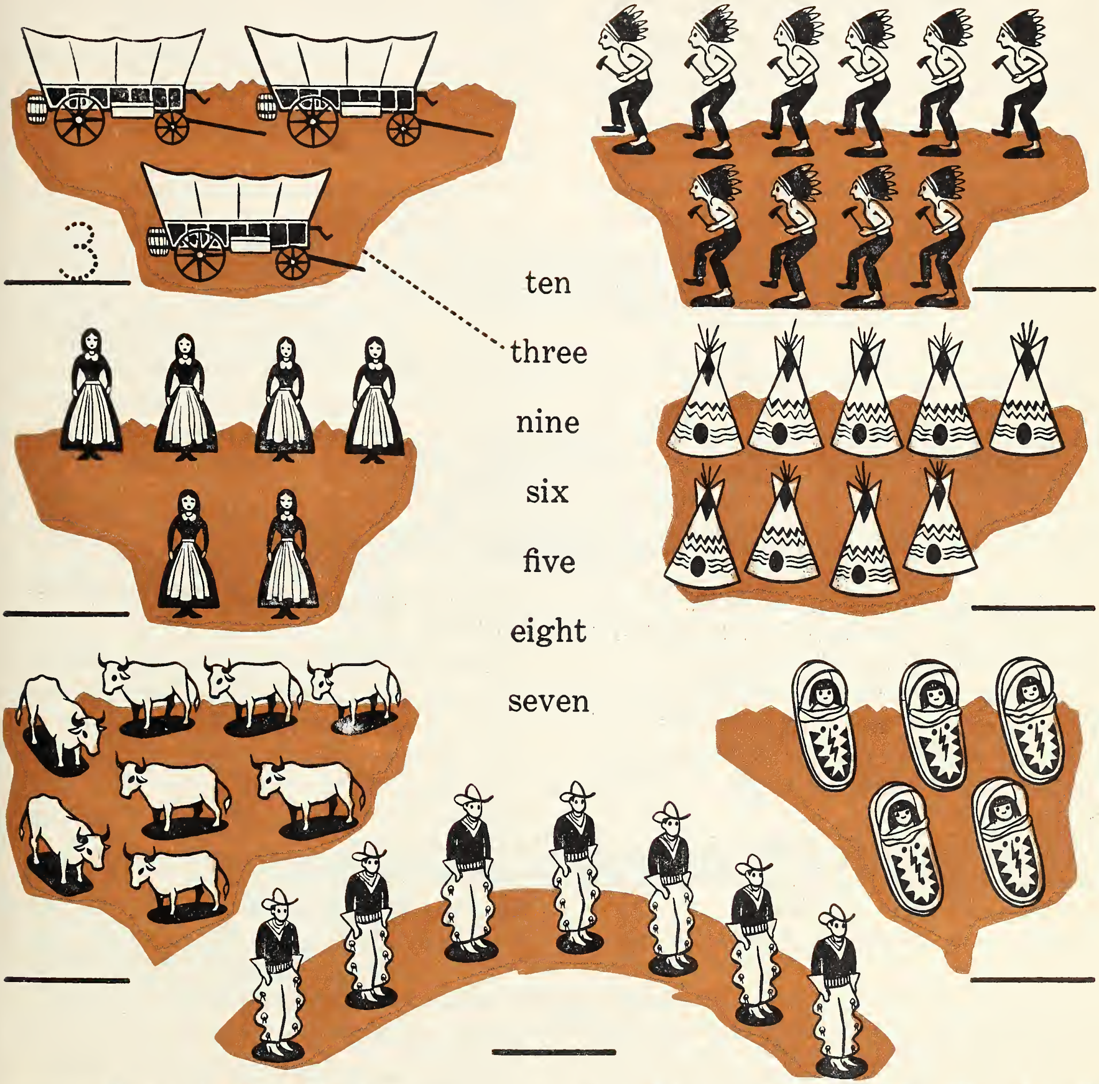
ten 10

If individual children need further help, have them trace number words that have been written on the blackboard or on large pieces of paper as they pronounce the words.

Enrichment activities. Those children who had no difficulty with page 15 may practise writing the number words so that they can use them in writing number stories later.

three one five two four

Tell how many toys there are.



ten

three

nine

six

five

eight

seven

Write the numbers 1 to 10.

LEARNING TO READ NUMBER STORIES

Preparatory Activities

On page 16 the transition is made gradually to illustrated problems for the children to read and solve. The first two exercises give only the examples from number stories told orally. The last two present the entire stories in words to be read. At the bottom of the page, practice examples are provided for five of the facts which have been introduced.

Dramatization. Tell a number story and let the pupils dramatize it without completing the action to show the answer. The idea is to have the children *think* what the answer is and then state it. For example:

One girl is eating lunch. Four more girls are coming to eat. How many girls will be eating then?

Have 1 girl at a table pretending to eat. Have 4 more girls coming. Then stop the dramatization and ask, "How many girls will be eating when all of them are at the table?"

After the children have answered the question, write the story on the blackboard and have the children read it and write on their papers the answer to the question.

Next, have 3 boys pretend that they are eating lunch. Have 2 more boys standing near to indicate that they are going to eat lunch, too. Write the story on the blackboard: "Three boys are eating lunch. Two more boys are coming to eat. How many boys will be eating?"

Have the children read the story silently and write the answer on their papers. Check to see if they have the correct answer. If not, help them think through the story and find the answer.

Use other stories in the same way until the children understand how to read them and answer the questions. Use dramatization to help them become accustomed to thinking how many there will be when the action is completed.

Using Page 16

Tell the pupils that the exercises on this page will help them learn how to read and find the answers to number stories.

Tell a number story for the first picture. Then have the children read the question and write the answer. Use the same procedure for the second picture. These, or similar, stories may be used:

Four girls are giving the dog a bath. One more girl is coming to help. How many girls will be bathing the dog then?

Three hens are eating. One more hen is coming to eat. How many hens will be eating then?

Have the children study the next two pictures and read the number stories. In each case, they write just the number that answers the question. Since the questions ask, "How many dogs will be eating?" and "How many kittens will be eating?" no labels are needed for the answers.

The children should be able to do the practice exercise at the bottom of the page independently.

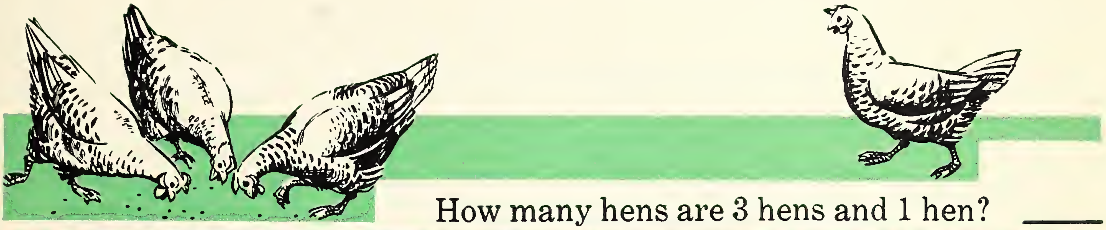
Follow-up Activities

Additional learning helps. If any of the children had difficulty with the problems, they should be given help before they go on to the new work.

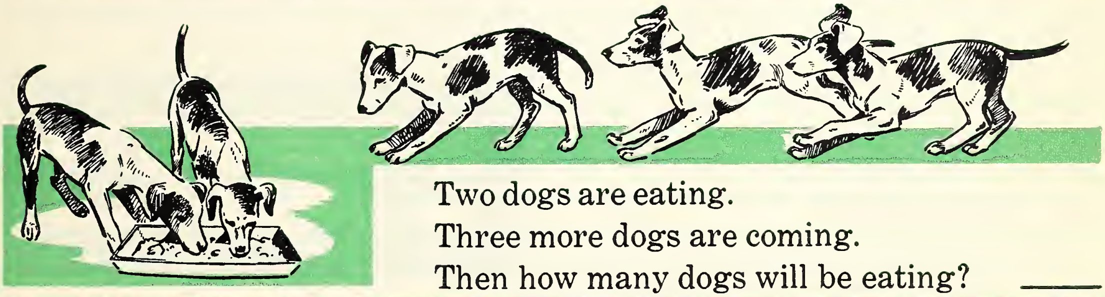
If additional dramatization experiences seem necessary, follow the procedures suggested under preparatory activities. As soon as possible, however, the children should be given experiences in reading and solving number stories without the aid of hearing them told or of dramatizing them.

Enrichment activities. The children may write some number stories and make pictures to illustrate them. A list of the facts that have been learned should be provided to make sure that the children will not make up problems that require facts not yet encountered.

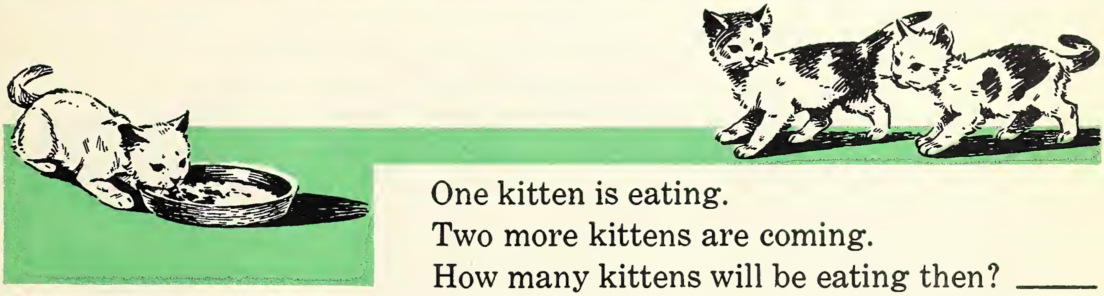
How many girls are 4 girls and 1 girl? _____



How many hens are 3 hens and 1 hen? _____



Two dogs are eating.
Three more dogs are coming.
Then how many dogs will be eating? _____



One kitten is eating.
Two more kittens are coming.
How many kittens will be eating then? _____

Tell how many there are in all.

1 cake	2 cows	1 boat	3 ponies	1 chicken
4 cakes	2 cows	1 boat	2 ponies	3 chickens
_____cakes	_____cows	_____boats	_____ponies	_____chickens

LEARNING ABOUT FRACTIONS

Preparatory Activities

The exercises on page 17 are designed to help the children develop an understanding of the fractional part *one-half*.

Using concrete materials. The concept of one-half should be developed first through a concrete activity in which the children actually use halves. A good example of such an activity is the Indian puppet show illustrated in the next column.

Give each child one sheet of 9″ x 12″ art paper, two 3″ x 4″ pieces of paper, a paper circle 4″ in diameter, and a paste stick or piece of cardboard ¼″ wide and 6″ long.

Have the children fold the 9″ x 12″ piece of paper in half the long way and crease it carefully on the fold. Develop the idea that this is a whole sheet of paper and that they must fold it so each of the two parts is exactly the same size as the other. Check to see that the parts are equal; then have them cut the paper on the fold. One piece becomes the background for the picture; from the other a 1-inch frame is cut. The frame is then pasted on the background, the bottom being left unpasted.

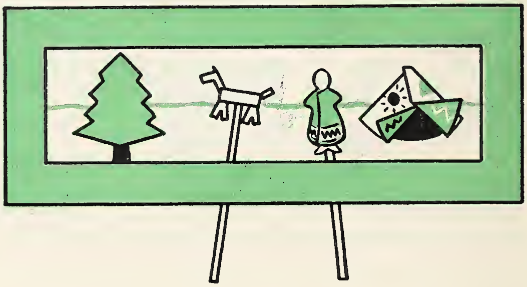
Have the children fold one of the 3″ x 4″ pieces of paper in half the long way, cut a pine tree from it, and paste the tree on the left side of the picture.

Have them fold the circle exactly in half and cut it on the fold. One half of the circle is used to make the Indian tepee. It is pasted opposite the tree.

The other 3″ x 4″ piece of paper is then folded and cut in half the short way. On one half the children draw an Indian and cut out the drawing. On the other half they draw a horse and cut it out.

Ask the children to cut the paste stick or cardboard into two equal pieces, as nearly as they can. Then discuss how many have really cut it into halves and how many have cut one piece larger than the other.

One stick should be pasted on the Indian and one on the horse. When the sticks are slipped between the picture and the frame at the bottom, the Indian and the horse can be moved around as stick puppets.



Using Page 17

Develop the idea that the cake at the top of the page is cut into pieces that are exactly the same size—equal—and that each piece is one-half of the whole cake. Have the children write the number that tells into how many pieces the cake has been cut.

Help the children to see that the two cakes in the second picture have each been cut into halves. Then have them color one-half of each cake.

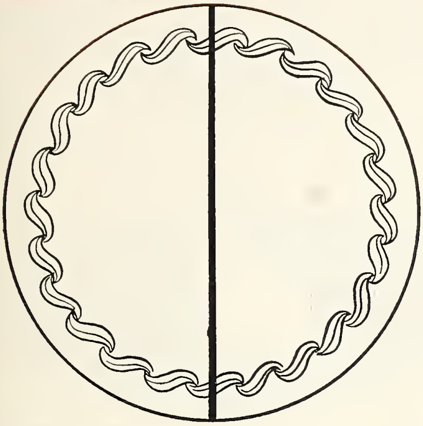
In the third exercise, help the pupils to see that one pie is whole, one pie is cut into two pieces that are *not* equal, and one pie is cut into two equal pieces—in half. After they discuss the pictures, have them put an X on the pie that is cut in half.

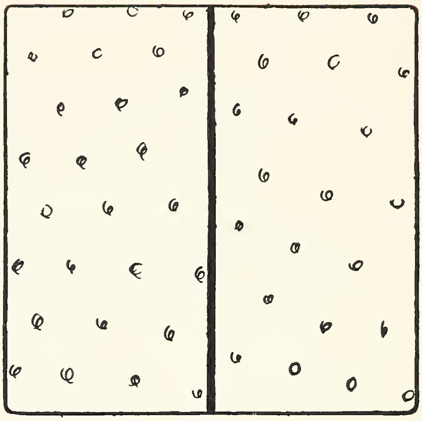
In the last exercise, have the children trace the dotted line, then draw lines from the words *in half* to each of the other things that are cut in half.

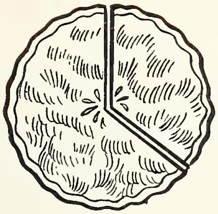
Follow-up Activities

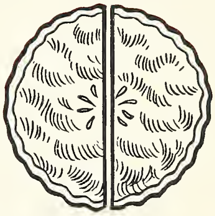
Additional learning helps. Those children who need more help should be given opportunities to see apples, paper plates, etc., that are cut into halves. Also, they may fold and cut into halves circles, squares, and rectangles of paper.

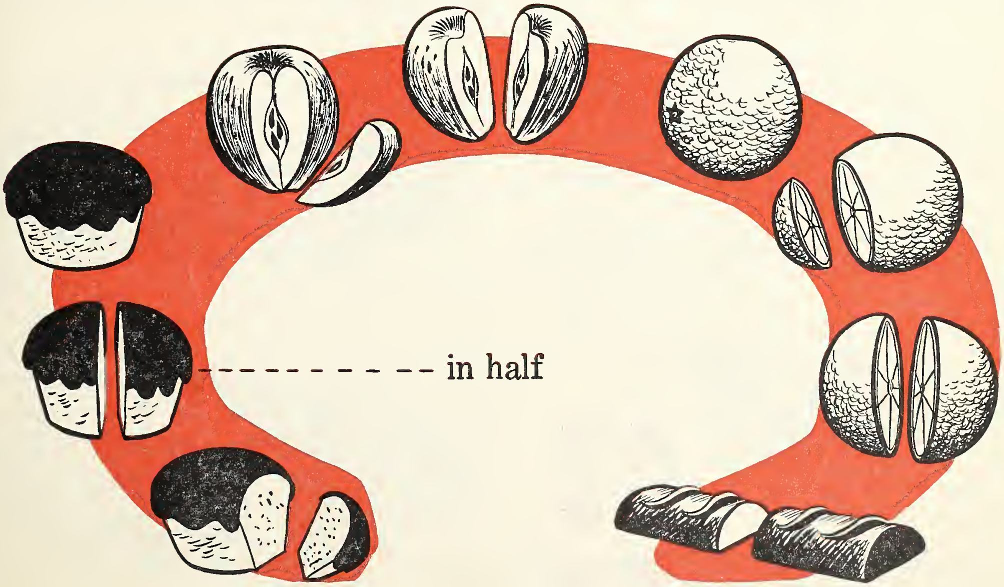
How many pieces? ____
One piece is as big as the other.
One piece is one-half.











RECOGNIZING GROUPS OF SIX

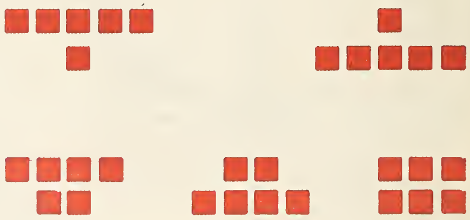
Preparatory Activities

The purpose of the exercise on page 18 is to extend and enrich the children's understanding of the number *6* by having them work with groups of 6. Experiences are provided with all of the possible group arrangements that parallel the addition facts with sums of 6. These experiences develop background for understanding the addition facts.

Using concrete materials. The children should first identify groups of 6 without attention to the smaller groups that make up the 6. Among the groups with which they work may be some of 2, 3, 4, and 5. This will strengthen their understanding of 6 as a larger group, and will help maintain skill in recognizing groups that have the same number of objects in them and groups that are larger and smaller.

The procedures suggested earlier for working with groups may be used to help the children discover groups of 6 in patterned arrangements of concrete materials.

At first, books or chairs or children may be used to build the groups. Then, with small concrete objects such as crayons or blocks, each child should build the groups on his desk as the teacher directs the activity. All of these arangements should be included:



Using Page 18

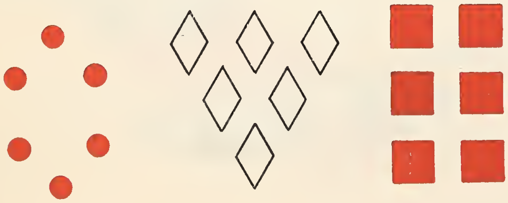
Help the children to see that in each picture some of the kittens are on the rug and some are off the rug. Then, for each picture, ask, "How many kittens are on the rug? How many are off the rug? How many kittens are in the picture?"

The children read the question and write the answer. Finally, ask this question about each picture and have the children respond orally: "Is the group of kittens on the rug larger, smaller, or the same size as the group of kittens off the rug?"

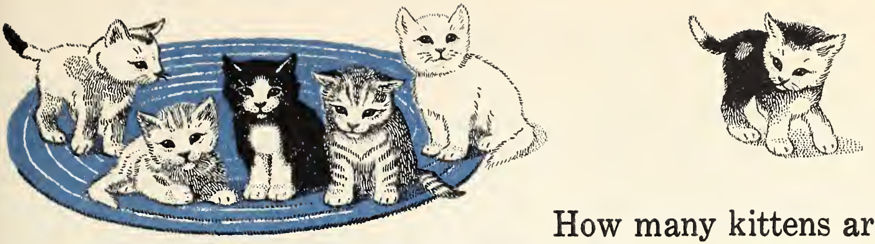
Follow-up Activities

Additional learning helps. If some of the children need more help in learning about groups of 6, they should continue to work with concrete materials under careful supervision of the teacher.

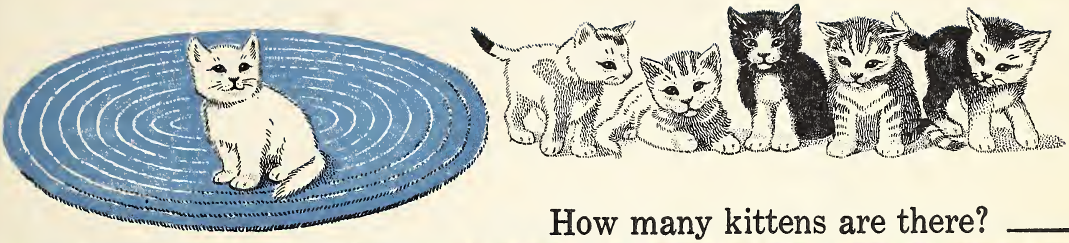
Enrichment activities. The children who do not need extra help at this time may make designs using different arrangements of groups of 6 objects, as:



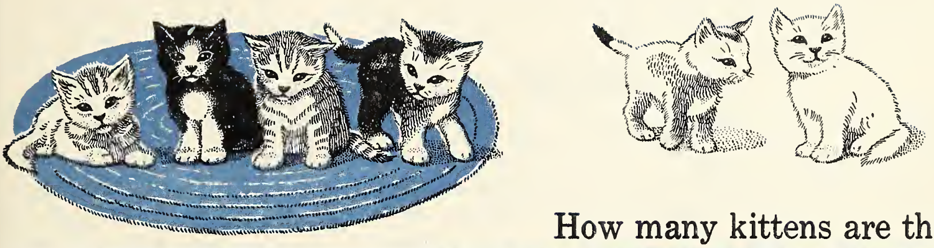
Or they may look in magazines for pictures which show groups of 6 objects. Since they will be working with groups of 6 for several days, the pictures should be mounted on a large piece of wrapping paper for use as a source of number story material later. For example, there might be a picture of 4 children on a sled with 2 more children coming to slide. Someone may find a picture of a train with 5 cars for passengers and 1 for mail or baggage. Pictures often suggest excellent ideas for number stories which can be told by the teacher or the children. They also help the children understand ways in which number is used in out-of-school situations.



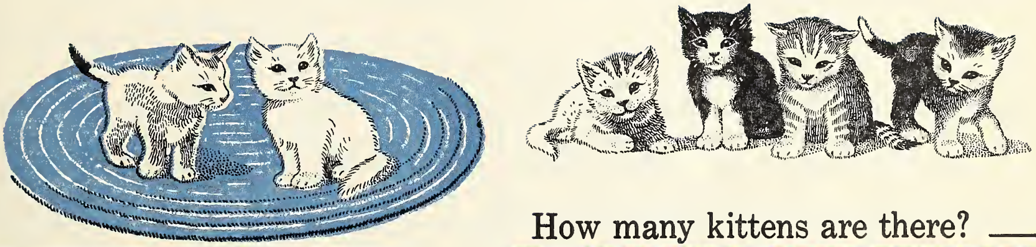
How many kittens are there? _____



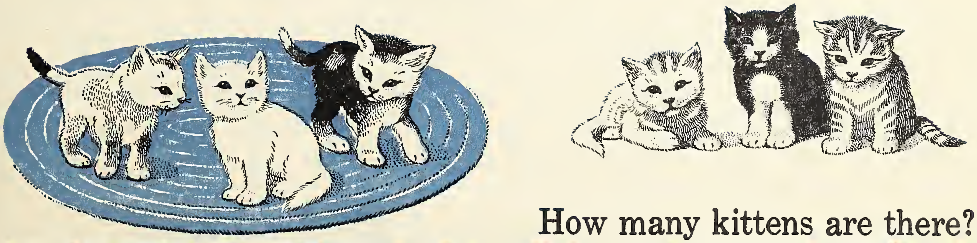
How many kittens are there? _____



How many kittens are there? _____



How many kittens are there? _____



How many kittens are there? _____

MAKING GROUPS OF SIX

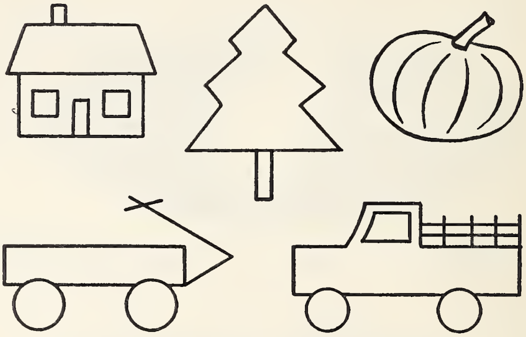
Preparatory Activities

The exercises on page 19 provide concrete experiences with groups of 6 that parallel the addition facts with sums of 6. Also provided are maintenance exercises in reading number words and writing the numbers *1* to *10*.

Drawing pictures to illustrate the groups. Have the children draw on the blackboard pictures of houses, trees, squares, circles, or other objects in all of the possible arrangements to parallel the addition facts with sums of 6. These are:

5 and 1
1 and 5
4 and 2
2 and 4
3 and 3

The teacher may suggest, for example, that a child first draw 5 trees, then draw 1 more tree and write the number that shows how many he drew in all. Another child may draw 1 house; then he may draw 5 houses. This activity should continue until all five arrangements are illustrated. Simple line drawings such as these will be easy for the children to make:



Using Page 19

Have the pupils read the first direction. Then have them draw the 4 balls. Next, have them read the second direction and draw the 2 balls. The total number of balls they drew is then written in the blank at the right. In the remaining exercises, the same procedure should be used.

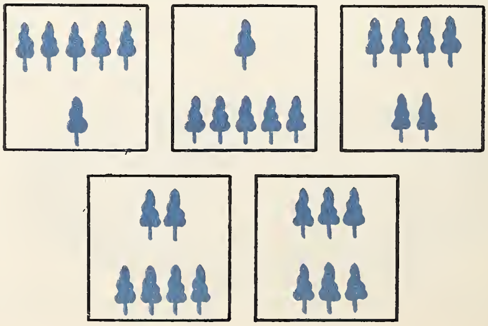
Make sure that the children can read the directions at the bottom of the page. Then have them do the exercises independently. Careful checking will reveal which children need additional help in reading the number words and writing the symbols *1* to *10* in sequence.

Follow-up Activities

Additional learning helps. If some of the children had difficulty with page 19, the teacher may help them make study and practice cards with simple line drawings to illustrate the groups of 6, as suggested for groups of 5 on page 40 in this book.

Any children who are still having difficulty in reading number words and writing the numbers to 10 should be given more experiences of the kind suggested for additional learning helps on page 20 in this book. In some cases individual assistance may be needed; in others, several children may be supervised while working at the blackboard together.

Enrichment activities. Let the faster learners test themselves by trying to discover with concrete materials all of the arrangements of 6 without help from the book or the teacher. Then they may make illustrated practice cards for the game table, as:



Draw 4 balls.

Then draw 2 more balls. ____

Draw 2 balls.

Then draw 4 more balls. ____

Draw 3 balls.

Then draw 3 more balls. ____

Draw 5 balls.

Then draw 1 more ball. ____

Draw 1 ball.

Then draw 5 more balls. ____

Read the number words. Write the numbers.

seven	ten	three	eight	five	nine	six
____	____	____	____	____	____	____

Write the numbers 1 to 10.

LEARNING MORE ADDITION FACTS

Preparatory Activities

The five addition facts with sums of 6 are introduced on page 20 with picture stories which help the children discover for themselves the answers to the examples on the page. The facts are: 3 and 3 are 6, 5 and 1 are 6, 1 and 5 are 6, 4 and 2 are 6, and 2 and 4 are 6.

Dramatization. Tell the children number stories which they can dramatize. After each dramatization, the fact should be written on the blackboard in both the horizontal and the vertical forms. The stories may relate to actual classroom activities, or stories such as the following may be used:

Three girls were picking flowers. Three more girls came. Then how many girls were picking flowers?

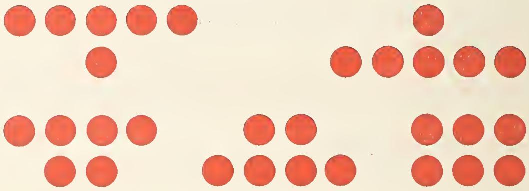
Five girls were watching a television show. One more girl came to watch. How many girls were watching television then?

One cowboy was branding calves. Five more cowboys came to help. Then how many cowboys were branding calves?

Four boys were raking leaves. Two more boys came to help. How many boys were raking leaves then?

Two boys were popping corn. Four more boys came to help. Then how many boys were popping corn?

Discovering the facts with concrete objects. Have the boys and girls build the facts with concrete objects, directing them carefully to be sure that they build the facts correctly. The objects should be placed in these arrangements:



Using Page 20

A number story should be told for each picture. The children write the answer to the horizontal example. Then they write the example in vertical form and add to find the answer. It should be made clear that the numbers in the vertical example should be written in the same sequence as they occur in the horizontal example, and that they should be added from the top down.

The following stories may be used in interpreting the picture situations.

Three boys were digging potatoes on a farm. Three more boys came to help. How many boys were digging potatoes then?

Five cows were standing under a tree. One more cow came. How many cows were standing under the tree then?

One cow was standing under a tree. Five more cows came. Then how many cows were standing under the tree?

Four ponies were drinking from a trough. Two more ponies came to drink. How many ponies were drinking then?

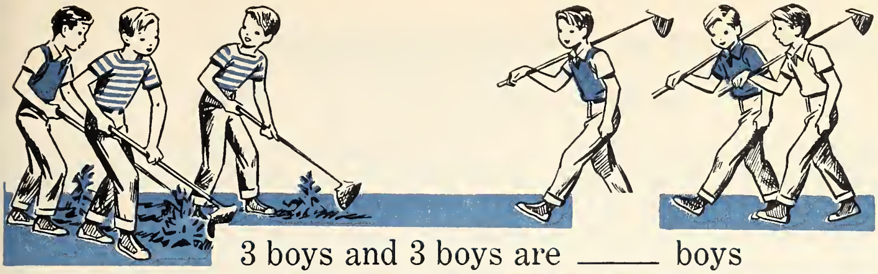
Two ponies were drinking from a trough. Four more ponies came to drink. Then how many ponies were drinking?

Follow-up Activities

Additional learning helps. The slower learners may need additional dramatization experiences with number stories using the new facts.

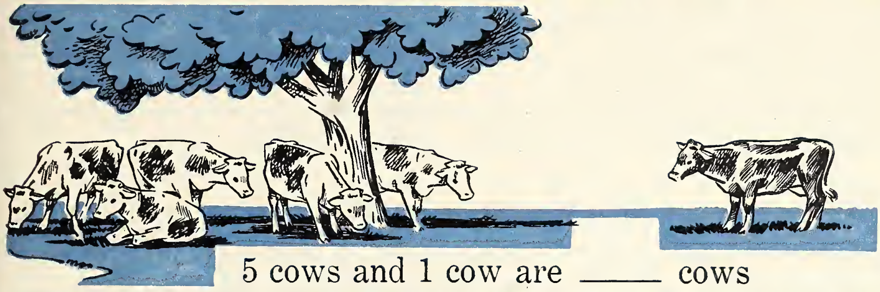
They may also need to build the facts again with concrete objects while the teacher supervises to make sure that each child discovers the answers for himself.

Enrichment activities. The children who do not need the teacher's help at this time may look through pictures they have cut from discarded magazines to find some which illustrate number stories that use the facts with sums of 6. Number stories based on these pictures can be written or told later for maintenance purposes.



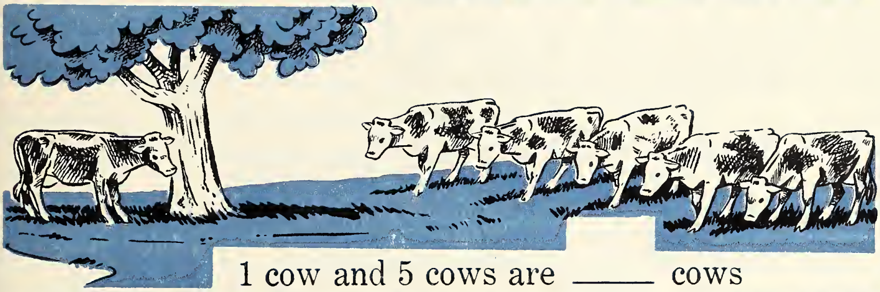
3 boys and 3 boys are ____ boys

boys
____ boys
____ boys



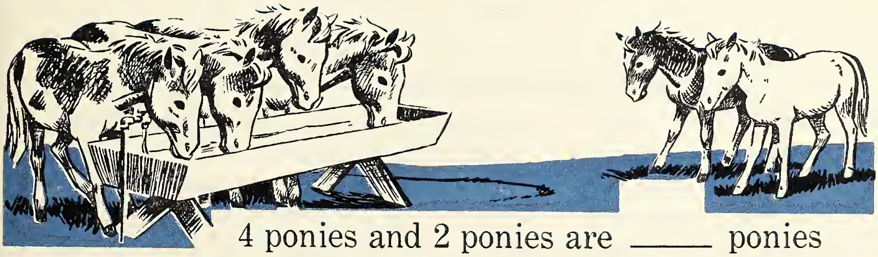
5 cows and 1 cow are ____ cows

cows
____ cow
____ cows



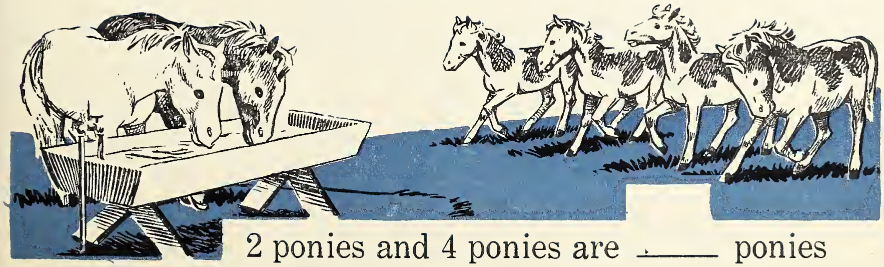
1 cow and 5 cows are ____ cows

cow
____ cows
____ cows



4 ponies and 2 ponies are ____ ponies

ponies
____ ponies
____ ponies



2 ponies and 4 ponies are ____ ponies

ponies
____ ponies
____ ponies

USING FACTS IN STORIES AND EXAMPLES

Preparatory Activities

The exercises on page 21 provide an opportunity for the children to use in number stories and examples the facts that have just been introduced and some facts learned earlier. The number stories are given orally. Since the action is not so pronounced as in the stories given previously, the children are helped to make the transition to problems in which there is no action. This anticipates the problem solving exercises on pages 22 and 28.

Using dramatization. Before the children use page 21, it may be helpful to have them dramatize number stories of a somewhat static type, such as the following:

Mary had 5 crayons on her desk. Sue had 1 crayon on her desk. How many crayons were there in all?

Similar stories may be told using the other facts with sums of 6. These are: 1 and 5 are 6, 4 and 2 are 6, 2 and 4 are 6, 3 and 3 are 6.

Using Page 21

On previous pages which presented number stories, the example from the number story was given as a question for the pupils to read. On this page, the question asks how many hats, beds, and so on, the children have made. The children are to write the number which shows the answer.

These, or similar, stories may be told from the pictures:

Sue made 5 doll hats. Ruth made 1 more hat. How many hats did the girls make in all?

Sue made 2 doll beds from boxes. Ruth made 4 more beds. How many beds did they make?

Tom made 2 airplanes. Ruth made 3 more airplanes. How many airplanes did they make in all?

Ruth made 1 stocking doll. Sue made 5 more dolls. How many dolls did the girls have then?

Sue made 4 boats with sails. Tom made 2 more boats. How many boats did they make?

Tom made 3 wagons from boxes. Ruth made 3 more wagons. How many wagons did they make in all?

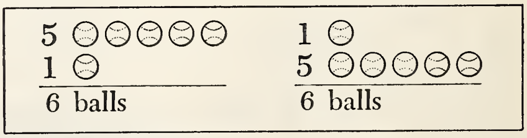
The children should do the examples at the foot of the page without help from the teacher.

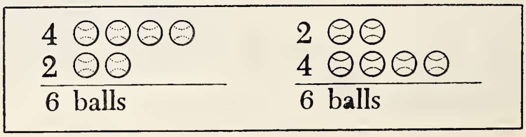
Follow-up Activities

Additional learning helps. If the children's responses to the exercises on page 21 indicate that some of them do not know the facts about 6, the teacher may help them make illustrated study and practice cards. It may be necessary also to have these children dramatize more number stories, as suggested for preparatory activities. The dramatization can be varied by having each child play the story at his desk. The children may pretend that blocks, pegs, or other concrete objects are the things mentioned in the number stories.

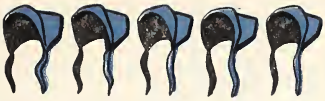
Enrichment activities. The faster learners may make illustrated number cards for the facts with sums of 6, or they may make up number stories using the facts. They may illustrate the stories.

The teacher may point out to these children the pairs of facts in this group: 5 and 1 are 6, 1 and 5 are 6; 4 and 2 are 6, 2 and 4 are 6. Then the children may write the facts in pairs and illustrate them, as:

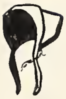




Sue's hats

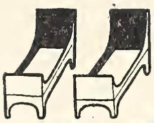


Ruth's hat

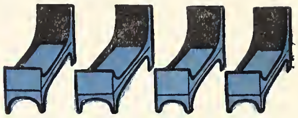


How many hats? ____

Sue's beds

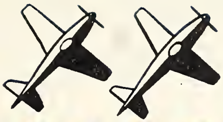


Ruth's beds

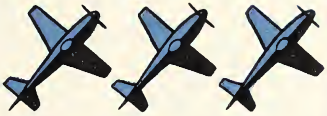


How many beds? ____

Tom's airplanes

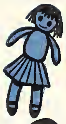


Ruth's airplanes

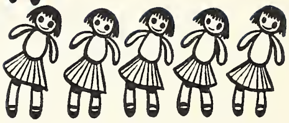


How many airplanes? ____

Ruth's doll

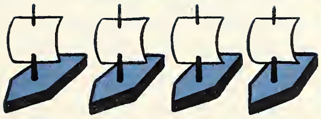


Sue's dolls

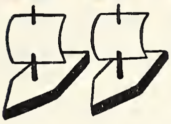


How many dolls? ____

Sue's boats

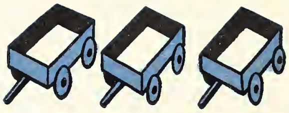


Tom's boats

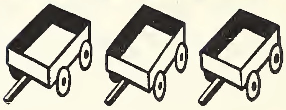


How many boats? ____

Tom's wagons



Ruth's wagons



How many wagons? ____

Tell how many there are in all.

3 cows	5 dogs	3 dolls	2 kittens	4 balls
2 cows	1 dog	1 doll	4 kittens	1 ball
____cows	____dogs	____dolls	____kittens	____balls

2 pigs	1 duck	3 ponies	1 rabbit	4 cakes
1 pig	5 ducks	3 ponies	4 rabbits	2 cakes
____pigs	____ducks	____ponies	____rabbits	____cakes

LEARNING TO READ AND UNDERSTAND PROBLEMS

Preparatory Activities

The exercise on page 22 is planned to help the children take the next step in learning to read and understand problems. Only one problem, or number story, is illustrated. The children make pictures to illustrate the others.

Reading number stories. The teacher should make sure that the children can read and understand the number stories. This will probably require some preliminary work because the kind of reading needed for problems is quite different from the simple narrative reading which the children have encountered in their regular reading instruction.

Dramatization should be used only if necessary. However, two or three number stories such as the following should be put on the blackboard for the children to read silently.

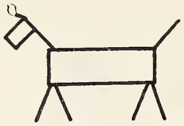
John made 4 ducks. Bob made 2 ducks. How many ducks did the boys make?

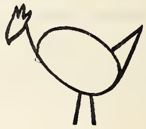
John made 1 pony. Bob made 5 ponies. How many ponies did the boys make?

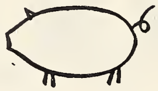
Bob made 1 hen. John made 2 hens. How many hens did the boys make?

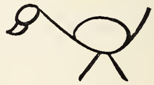
Three of John's ducks are eating. One of Bob's ducks is eating. How many ducks are eating?

Models drawn on the blackboard will help the children learn how to make simple drawings to illustrate the number stories.


pony


hen


pig


duck

If the children have difficulty reading the number stories, give them whatever help is needed with vocabulary. If it still seems necessary, let the children dramatize the stories to help them answer the questions. Use as many number stories as are needed to make sure that the children are prepared to read the problems and directions in their books.

Using Page 22

Explain that the picture at the top of the page shows some farm animals that two boys, John and Bob, made, and that each number story tells something and asks a question about the animals.

The children are to read each number story, and write the answer. The cardboard cows opposite the first story show the answer. The children should draw animals to illustrate the other stories. If they cannot do so, let them make X's and pretend that they are animals.

The teacher should supervise the work carefully, giving help to individual children as they do the exercise silently. Since this is a learning situation, the children should be given as much assistance by the teacher as they require.

Follow-up Activities

Additional learning helps. If some of the children need more help in reading and understanding number stories, their work should be analyzed carefully to find what their specific difficulties are. If they do not know the facts, experiences with concrete materials and with the facts cards can be continued.

It may be necessary for the teacher to work with these children as a group all through the year. At the same time, the children who have no difficulty may do such exercises silently and independently.

Enrichment activities. The faster learners may enjoy writing and illustrating number stories of their own. Any of the 15 facts they have learned can be used in the number stories.

John made 3 cows.
Bob made 3 cows.
How many cows did the boys make? ____

John made 5 ponies. Bob made 1 pony. How many ponies did the boys make? ____	Draw the ponies.
John made 3 pigs. Bob made 2 pigs. How many pigs did the boys make? ____	Draw the pigs.
John made 2 hens. Bob made 4 hens. How many hens did the boys make? ____	Draw the hens.

MAKING SURE TEST

Preparatory Activities

The purpose of page 23 is to test: (1) the children's concept of the fraction *one-half;* (2) their ability to read the number words *three* to *ten* and to write the symbols *1* to *10;* and (3) their knowledge of the 15 addition facts presented thus far.

The only preparation necessary for the test is an explanation of where the responses for each section of the test are to be written, and perhaps a demonstration at the blackboard of the way to use the fraction test.

Reviewing one-half. If the teacher feels that a review of the fraction *one-half* should be given before the children are tested on the concept, the following procedure may be used:

Draw on the blackboard three pies that are the same size. Paper plates are even better for demonstration purposes. Leave one pie whole, have another cut into two equal pieces, and have the third cut into two unequal pieces. Through discussion, develop the idea that the two pieces must be equal to be halves.

Using Page 23

In the first exercise the children draw a line from the words *in half* to each cake that is cut into halves.

In the second exercise the children are to write below each number word the number it says. Then they write in the squares the numbers *1* to *10* in sequence.

The procedure for working the examples in the last exercise is the same as on preceding pages.

Follow-up Activities

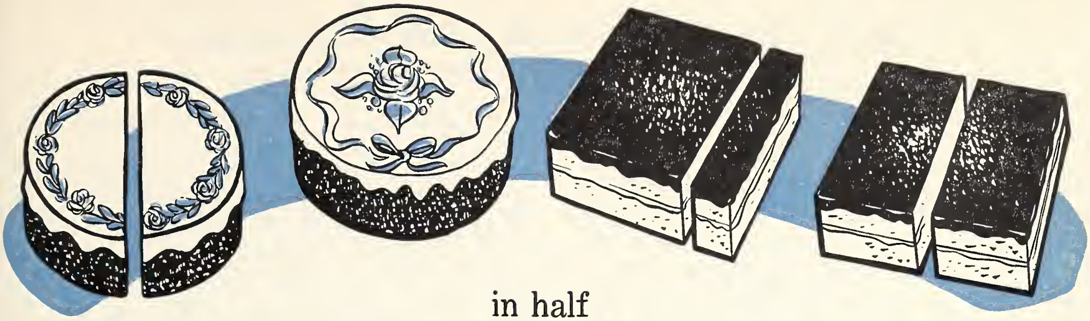
Diagnosing learning difficulties. Careful study of each child's work is necessary if individual learning difficulties are to be identified and corrected. The teacher can determine by observation or by working with individual children just why they had trouble. Only then can she plan effectively to correct the difficulties.

Keeping records of progress. An individual record for each child will enable the teacher to guide the child's learning more effectively. Such a record may be kept on file cards, on a page in a loose-leaf notebook, or on separate sheets in a folder.

While notes of progress should be recorded from time to time throughout the year, it is especially helpful to make them after each "Making Sure" test. For example, this first test will enable the teacher to note the specific addition facts the child has learned and those he needs to learn, the number words he can and cannot recognize, the symbols he makes well and those he does not, and whether he has the correct concept of the fraction *one-half.*

Meeting the needs of individuals. If there are some very slow learners in the group, they may need still more opportunities to develop facility in using the ideas presented so far. Unless their needs are met now, the slower children will become confused and frustrated as the new work is introduced. Time will be saved in the long run if they are helped now to learn the things they only partially understand. Only those children who need it should be required to retrace the learning steps, and those children should be given only the help they actually need. The suggestions given under the headings *Preparatory Activities* and *Additional Learning Helps* throughout this book will be useful in meeting their needs.

Detailed suggestions for finding individual difficulties, keeping records of progress, and meeting the needs of individual children are given also on page 14 in this book.



in half

Read the number words. Write the numbers.

seven	four	nine	six	ten	five	eight	three
____	____	____	____	____	____	____	____

Write the numbers 1 to 10.

Tell how many there are in all.

1 dog	2 rabbits	1 ball	2 cakes	4 cows
5 dogs	2 rabbits	3 balls	4 cakes	1 cow
____dogs	____rabbits	____balls	____cakes	____cows
1 hat	5 wagons	3 dolls	1 bed	3 boats
2 hats	1 wagon	2 dolls	1 bed	3 boats
____hats	____wagons	____dolls	____beds	____boats
1 toy	2 kittens	4 pigs	3 ducks	2 hens
4 toys	1 kitten	2 pigs	1 duck	3 hens
____toys	____kittens	____pigs	____ducks	____hens

UNDERSTANDING NUMBERS TO TWENTY; RECOGNIZING AND UNDERSTANDING THE VALUE OF COINS

The children are now ready for reteaching of the numbers 11 to 20. In this section of their book they are given experiences in counting and writing the numbers 11 to 20, and they learn the meaning of two-place numbers as a system of tens and ones. These experiences are immediately and logically followed by experiences with the money system—recognition of the penny, nickel, and dime, and the relative values of these coins.

Counting

Some of the children may already be able to count from 11 to 20 with understanding and ease. Others may need to use concrete objects and learn again, as they count these real things, to associate the number words with the appropriate objects as they are counted.

The ability to count is extended on page 27 to include counting coins by fives and tens. This ability is useful in out-of-school experiences. It also helps to establish the relative values of the penny, nickel, and dime.

The Meaning of Two-Place Numbers

The concept that any two-place number is made up of tens and ones is developed gradually. For example, from the simple idea that 12 means "10 and 2 more" the concept is developed that 12 means "1 ten and 2 ones." While the term *place value* is not used, the children discover that in the number 12 the figure on the left means 1 ten and the figure on the right means 2 ones; that 20 means 2 tens and no ones (0 ones).

Thus the foundation is laid for understanding our number system as a system of tens. When, over a period of a year or two, the idea of the place value of numbers has been developed, it becomes possible to build real understanding of carrying in addition and multiplication and borrowing in subtraction.

Writing the Numbers to Twenty

The practice provided for writing in sequence the numbers from 1 to 20 helps to develop understanding of our number system as a system of tens. It also enables both teacher and pupils to identify individual difficulties in writing figures that should be overcome at this time.

Many mistakes in arithmetic are made because the children do not make the figures legibly. Also there seems to be some correlation between neatness and thinking. High standards in neatness contribute to accuracy in other arithmetic activities. Therefore, emphasis is placed upon correct formation of figures and upon neatness. This emphasis is maintained throughout the program.

Understanding the Value of Coins

Since experiences with money bulk large in the child's use of arithmetic in his everyday life, an adequate treatment of money is essential at the second-grade level. The concepts and ideas about money which were introduced in Grade One are therefore thoroughly retaught and extended.

The words *penny, nickel, dime, cent,* and the sign ¢ are introduced on page 26 as part of the reading vocabulary of arithmetic, and the relative value of the coins is developed. For example, the children learn that a nickel will buy as much as 5 pennies, and a dime will buy as much as 10 pennies or 2 nickels. The concept that a penny is less money than a nickel or a dime is developed. Also, the concept that a dime is more money than a nickel or a penny and a nickel is more than a penny is clearly shown in these exercises.

Following the development above, the children are given practice in using money in number stories. These stories which involve money use some of the addition facts learned earlier.

LEARNING TO COUNT AND UNDERSTAND NUMBERS TO TWENTY

Preparatory Activities

The first exercise on page 24 provides experience in rational counting to 20. This will help the teacher make sure that the children know the number words in sequence and can use them to count objects.

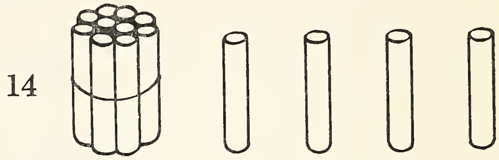
In the next exercise the children learn to read the number symbols 11 to 20, and they discover, by making pictures, that the numbers 11 to 20 mean ten and so many more.

Counting. A few concrete experiences in counting should be provided so the children can associate the numbers with actual things. As the pupil counts, he learns to associate one object, and only one, with each number word used. But he learns that any number, as 15, refers to the total number counted to that point. These should be motivated experiences that have usefulness for the children. They may count books to see if there are enough for the group. They may count scissors, rulers, pieces of art paper, as they are needed. They may count to find the number of girls who are present and the number of boys. They may count the bottles of milk to see if the milkman delivered as many as were ordered.

The next experiences in counting might be with small objects. For example, the teacher asks each child to place 10 buttons in a row on his desk; then to place 10 more buttons in another row. The children count to see how many buttons they have in the two rows.

To develop further the meaning of the numbers 11 to 20, the following activity is suggested. Toothpicks, 2-inch pegs, milk straws cut into 2- or 3-inch lengths, or counting sticks may be used.

Give each child 20 objects. Have him count out 10 of the objects and place a rubber band around them to make a bundle. Give the children small cards with the numbers 11 to 20 written on them. Ask them to place the card with 11 on it on their desks. Then have them place beside the number 11 a bundle of 10 objects and 1 more object. Repeat with 12, having them place 2 objects beside the bundle of 10. Continue until all of the numbers to 20 have been illustrated.



Mix the cards, and let each child choose a card and place objects in bundles of 10 and so many more to show what the number means. It is more challenging to illustrate the numbers in miscellaneous order than in sequence. The children will enjoy making a game of this activity by working in pairs or teams of two each to see how quickly and accurately they can demonstrate what each number means.

Building a number chart. An illustrated number chart built on the blackboard or on a large piece of wrapping or poster paper will be helpful in introducing the numbers and developing their meaning. This procedure may be used:

11 is ★★★★★★★★★★ ★
12 is ★★★★★★★★★★ ★★
13 is ★★★★★★★★★★ ★★★
14 is ★★★★★★★★★★ ★★★★
15 is ★★★★★★★★★★ ★★★★★
16 is ★★★★★★★★★★ ★★★★★★
17 is ★★★★★★★★★★ ★★★★★★★
18 is ★★★★★★★★★★ ★★★★★★★★
19 is ★★★★★★★★★★ ★★★★★★★★★
20 is ★★★★★★★★★★ ★★★★★★★★★★

The complete chart, placed on the bulletin board for reference and study, will be useful as the children use the numbers from this point on.

Learning to Count and Understand Numbers to Twenty (continued)

Using Page 24

Help the children discover by counting that there are 10 arrows below each quiver at the top of the page, and that there are 20 arrows in all.

Next, have them read the numbers 11 to 20 to make sure that each child can recognize the numbers to 20.

Help the children discover that there are 10 arrows in each quiver. Then let them read the line, "11 is ten and 1 more." They are to trace the 1 arrow to show that 11 is ten and 1 more.

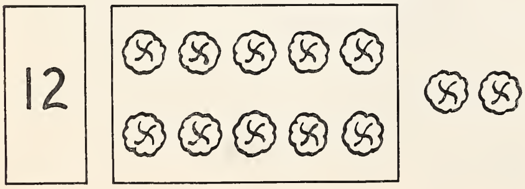
Proceed with 12 and 13 in the same way. Then have the children read each line from 14 to 20. They should note that the quiver holds 10 arrows, and draw extra arrows to show that each number is ten and so many more.

When the exercise is completed, have the children read each line again to tell what each number means. The concept that 20 is ten and 10 more, or 2 *tens,* should be carefully developed at this time in readiness for the exercise on page 25.

Follow-up Activities

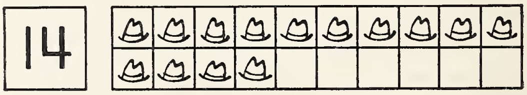
Additional learning helps. If the responses to the exercises on page 24 indicate that some of the children failed to demonstrate what the numbers 11 to 20 mean, the teacher will wish to retrace each step with them individually to discover the exact cause of the difficulty. If it was failure to understand the directions, the teacher may explain again just what was to be done, and let the children work with a similar exercise written on the blackboard.

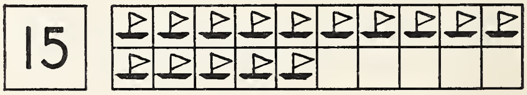
If the difficulty lies in lack of understanding that the numbers are made up of ten and so many more, the suggestions for preparatory activities should be repeated. It may be helpful also to place on the blackboard an exercise such as the one below, which shows 10 cookies in a box. The children count to find that there are 10 cookies. The teacher then writes beside the picture any number from 11 to 20, and asks a child to draw as many more cookies as are needed to show what the number means. The additional cookies may be erased and other numbers substituted as many times as desired.

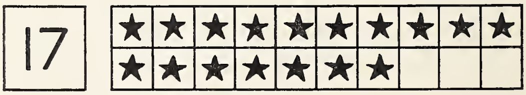


Enrichment activities. Some of the faster learners may use this matching game:

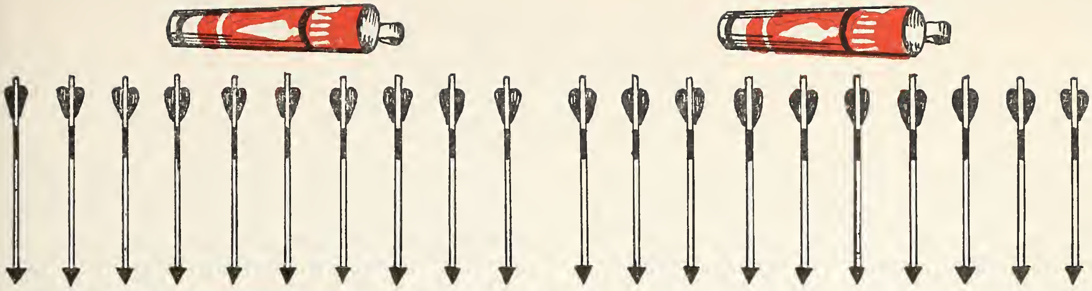
Make a set of cards with the numbers 11 to 20. Then cut ½″ squared paper into strips, with two rows of 10 squares on each strip. Draw pictures in the squares to show what each number means. For example:







Other children may make bundles of 10 objects each to use with the exercises on the next page and on pages to come later. Rubber bands placed around each bundle of 10 objects will keep the objects together. Sometimes it is possible to secure from an ice cream dealer packages of the small wooden spoons which are distributed with individual ice cream cartons. Sucker sticks are excellent also to use for counting. If other materials are not available, small strips of cardboard may be used.



11	is		ten	and 1 more	↓									
12	is		ten	and 2 more	↓	↓								
13	is		ten	and 3 more	↓	↓	↓							
14	is		ten	and 4 more										
15	is		ten	and 5 more										
16	is		ten	and 6 more										
17	is		ten	and 7 more										
18	is		ten	and 8 more										
19	is		ten	and 9 more										
20	is		ten	and 10 more										

DISCOVERING TENS AND ONES; WRITING THE NUMBERS 11 TO 20

Preparatory Activities

The purpose of page 25 is to help the children learn that each number from 11 to 19 means 1 ten and so many ones and that 20 means 2 tens. Practice is also provided on writing the numbers from 1 to 20 in the correct sequence.

Learning about left and right. The terms *left* and *right* are needed in understanding two-place numbers, and should be developed orally. The concept of left hand and right hand, developed first in connection with shaking hands, giving the flag salute, etc., will lead into the concept of left and right as used in other ways: the left and right sides of a page, the picture on the left and the one on the right, the left and right sides of the blackboard. Next, the transition should be made to two-place numbers by having the pupils tell which figure is on the right and which is on the left in each of the numbers 11 to 20.

Using concrete objects to discover what numbers mean. The bundles of 10 objects each which the children made in connection with earlier pages may be used again to develop the tens and ones idea. Hold up a bundle of 10 objects, such as counting sticks. Ask how many sticks there are in the bundle. After the pupils answer "10," explain that such bundles may be counted as tens: one bundle is 1 ten, two bundles are 2 tens, and so on.

Then hold up a single stick and ask how many ones there are. After the pupils answer "1," explain that the single sticks may be counted as ones: one stick is one, two sticks are 2 ones, and so on.

Explain to the children that we can find out what a number with two figures means by finding how many tens and how many ones there are in it. Fourteen is 1 ten and 4 ones. The figure on the left in 14 means 1 ten. The figure on the right means 4 ones. So 14 means 1 ten and 4 ones. One bundle of sticks and 4 more sticks may be arranged to illustrate this idea.

Demonstrate how many tens and how many ones there are in each number from 11 to 19. Then hold up two bundles of sticks and explain that 20 means 2 tens.

Using Page 25

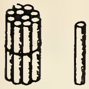
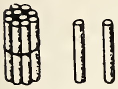
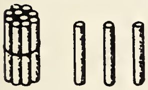
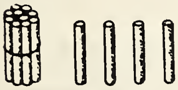
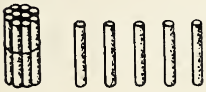
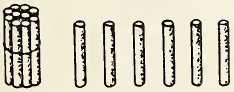
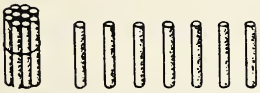
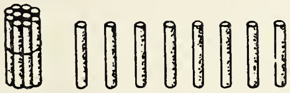
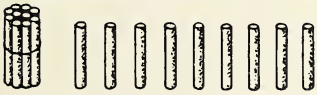
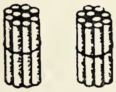
Explain that there are 10 sticks in each bundle in the pictures. Have the pupils count to find how many ones there are with each ten. Tell them that they are to find how many tens and how many ones each number means. The models in the first two lines will show them where to write the numbers that tell how many tens and how many ones there are in 11 and 12. The children are to trace the dotted lines. Have them write the numbers 11 and 12 in the boxes.

Proceed in the same way with the numbers 13 to 20. Since this is a rather difficult step, help should be given to individual children as it is needed.

In the exercise at the bottom of the page, the children are to write in sequence the numbers 1 to 20.

Follow-up Activities

Additional learning helps. If some of the children need additional help in understanding the meaning of the numbers 11 to 20, they may be given more experiences with concrete objects, as suggested in the preparatory activities. If other children need help in writing the numbers 11 to 20, have them trace numbers that have been written on the blackboard or on large sheets of paper for individual use.

	11 is 1 ten and 1 one	11	
	12 is 1 ten and 2 ones	12	
	13 is ____ ten and ____ ones	13	
	14 is ____ ten and ____ ones	14	
	15 is ____ ten and ____ ones	15	
	16 is ____ ten and ____ ones	16	
	17 is ____ ten and ____ ones	17	
	18 is ____ ten and ____ ones	18	
	19 is ____ ten and ____ ones	19	
	20 is ____ tens	20	

Write the numbers 1 to 20 in the boxes.

1									
11	12								

RECOGNIZING AND UNDERSTANDING THE VALUE OF COINS

Preparatory Activities

The purpose of page 26 is to help the children learn to recognize the penny, nickel, and dime and to understand their value. The word *cent*, and the sign ¢, and the names of the coins are introduced.

Using concrete materials. While one can almost assume that all second-grade children can recognize a penny, a nickel, or a dime, they may not be able to read the names of the coins or understand their relative value.

These concepts can be taught best with actual coins which the children can handle and count. If this does not seem advisable, toy money may be provided.

After the teacher has made sure that each child can recognize a penny, a nickel, and a dime, the names of these coins should be written on the blackboard along with the following words and symbols: *one cent, 1¢; five cents, 5¢*; and *ten cents, 10¢*. Practice should be provided in associating the words and symbols with the proper coins.

Playing store. Then the children may play store, pretending to buy things that cost 1 cent each, such as stamps, picture cards, balloons, pieces of candy, cookies, chewing gum, etc.

This dramatic play should be guided so the children will learn not only that a penny or 1 cent will buy 1 card, but also that 5 pennies or 1 nickel will buy 5 cards; and 10 pennies, or a dime, or 2 nickels, will buy 10 cards. In this way the children will learn the value of the coins.

Using Page 26

Help the children study the details of the coins and read the sentences under the coins at the top of the page. Next, develop the idea that a penny, or 1 cent, will buy 1 piece of candy, and have the children trace the symbol *1¢*. Show that if 1 penny will buy 1 piece of candy, 5 pennies will buy 5 pieces of candy. Then help the children to see that a nickel has the same value as 5 pennies and will therefore buy the same number of pieces of candy. Have the children trace the symbols beside the pictures of 5 pennies and of 1 nickel. Then have them write in the blanks the number that tells how many pieces of candy the coins will buy.

Develop the relationship between the 10 pennies, the dime, and the 2 nickels in the same way, having the children trace the symbol *10¢* each time, and write in the blank the number of pieces of candy the 10 pennies, the 2 nickels, and the dime will buy.

In the last exercise on the page the children should write the number of cents each coin represents, using the cent sign to label each response.

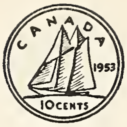
Follow-up Activities

Additional learning helps. If any of the children need additional help, experiences with actual coins or with toy money, as suggested in the preparatory activities, may be continued. For example, have them buy 5 pencils with 5 pennies. Then have them read the words "five cents" on the nickel and discover that they can buy 5 pencils with a nickel also. Next, 10 pennies may be used to show the value of a dime; then 2 nickels may be used to buy pencils and to develop the fact that 10 pennies, 2 nickels, or one dime will pay for 10 pencils.

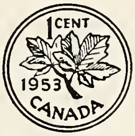
Enrichment activities. The children who do not need the teacher's help may make pictures of things they can buy for a penny, a nickel, or a dime, as:

A penny is 1 cent.

A nickel is 5 cents.

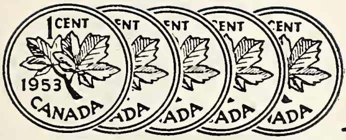


A dime is 10 cents.



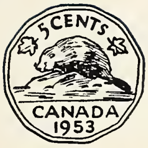
1¢

1



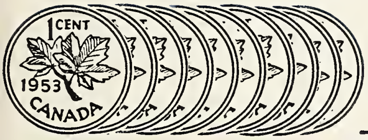
5¢

____



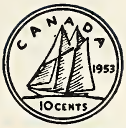
5¢

____



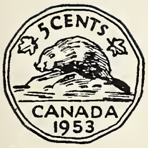
10¢

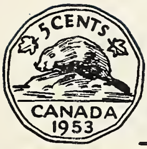
____



10¢

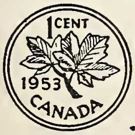
____





10¢

____



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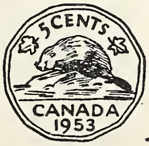

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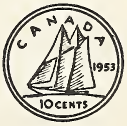

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COUNTING BY FIVES AND TENS

Preparatory Activities

The exercises on page 27 serve two purposes: (1) they help the children learn to count by fives and tens, (2) they strengthen the concept that a nickel has the same value as 5 pennies and a dime has the same value as 10 pennies.

Making a number chart. It will be helpful to provide a number chart as a guide to the children as they learn to count by fives and tens; for example:

1 2 3 4 ⑤ 6 7 8 9 ⑩
11 12 13 14 ⑮ 16 17 18 19 ⑳

1 2 3 4 5 6 7 8 9 ⑩
11 12 13 14 15 16 17 18 19 ⑳

Using concrete materials. If possible, give each child the following coins in either real or play money: 20 pennies, 4 nickels, 2 dimes.

Have the children count their pennies by fives to see how many cents they have.

Have them count the nickels as fives to see how much money they have in nickels.

Have them count the dimes as tens to see how much money they have in dimes.

Now the children may list items that cost 5 cents, as 5-cent candy bars and pencils. Let them tell how many 5-cent items they can buy with their pennies; their nickels.

Have them list items that cost 10 cents, as toy cars or candy bars. Have them tell how many 10-cent items they can buy with their dimes; their nickels; their pennies.

Using Page 27

Have the children count the pennies at the top of the page by fives and write the number of cents in the blanks as they count "5, 10, 15, 20." Then, in response to the question, "How much money in all?" have them write the total amount they counted. Call attention to the words *five cents* on each nickel. Tell the children to count the nickels as fives (not by fives), write the number they say each time, and write the answer to the question.

Next, have them count the pennies by tens, writing the numbers in the blanks as they count "10, 20." Then have them write the total amount of money they counted in response to the question.

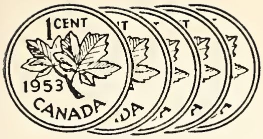
Call attention to the words *one dime* on each dime. Elicit the statement that each dime is as much money as 10 pennies. Have them count the dimes as tens, write the numbers they say, and write the answer to the question.

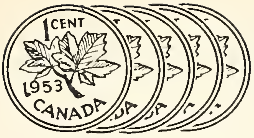
Follow-up Activities

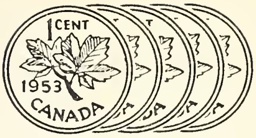
Additional learning helps. If there are some children who need more help with counting by fives and tens, using pennies, nickels, and dimes, activities similar to those suggested in the preparatory activities should be used.

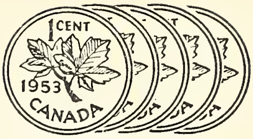
Sometimes the difficulty in counting nickels and dimes as fives and tens is caused by failure to understand why we say "five" when we have only one nickel and "ten" when we have only one dime. Care should be taken to have the children think of each nickel as representing 5 cents and each dime as representing 10 cents. That is why we say, "Count the nickels *as* fives and the dimes *as* tens," rather than "*by* fives or tens."

Enrichment activities. The faster learners may make a list of items that can be bought for a nickel, a dime, or 20 cents. Then they may play store with toy money and pretend that they are buying the various items on their list. If they wish, they may mark tags with 5¢, 10¢, or 20¢, and attach them to toys or other objects to use in their store.



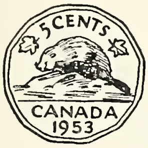


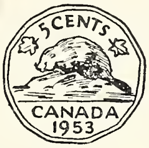


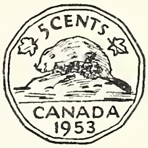


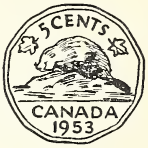
______ ______ ______ ______

How much money in all? ______ cents



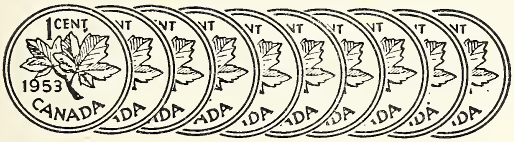


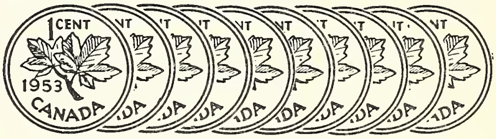




______ ______ ______ ______

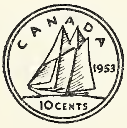
How much money in all? ______ ¢

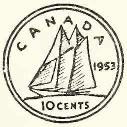




______ ______

How much money in all? ______ ¢





______ ______

How much money in all? ______ cents

USING MONEY IN NUMBER STORIES

Preparatory Activities

The number stories on page 28 are closely related to the out-of-school experiences of the children. They introduce as part of the vocabulary of arithmetic the words *buy* and *pay*, and they give practice in problem situations on five of the addition facts that have been learned.

Playing store. The words *buy* and *pay* are new on page 28 and should be carefully developed as reading words. Also, the word *cents* and the sign ¢ should be thoroughly reviewed. This can be accomplished through a realistic situation such as playing store.

Several items marked with price tags should be provided. For example, crayons for 1 cent each, a small eraser for 2 cents, a pencil for 3 cents, a ruler for 4 cents, and a package of paper for 5 cents.

The teacher says to a child who is pretending to buy something in the store: "Buy a crayon for 1 cent. Buy a pencil for 3 cents. How much will you pay?"

Several stories using known addition facts and the words *buy* and *pay* may be given orally. The children buy the things and pay for them with toy pennies, making sure they have paid the right amount each time.

The teacher writes the number stories on the blackboard, then has the children read them, orally at first, then silently, and write the answers on their papers, using the cent sign.

Using Page 28

Discuss with the children the picture of the school toy sale. Let them identify the things to be bought and tell what each costs.

When they understand where they are to write the answers to the questions in the number stories, the children should read the number stories silently and write the answers. The children should be told that they are to write the sign to show that each answer means money. The model after the first story shows where to write the sign, and the children should trace it.

Follow-up Activities

Additional learning helps. If some of the children need additional help in reading and solving number stories, let them make up number stories of their own. The teacher should first write on the blackboard all of the addition facts that have been learned. Then each pupil may be asked to use one of the facts in a number story.

After several stories have been given orally, the teacher may write a few on the blackboard for the children to read silently and dramatize, as:

Ruth will buy a ball for 5 cents.
Then she will buy a cake for 1 cent.
How much will she pay?

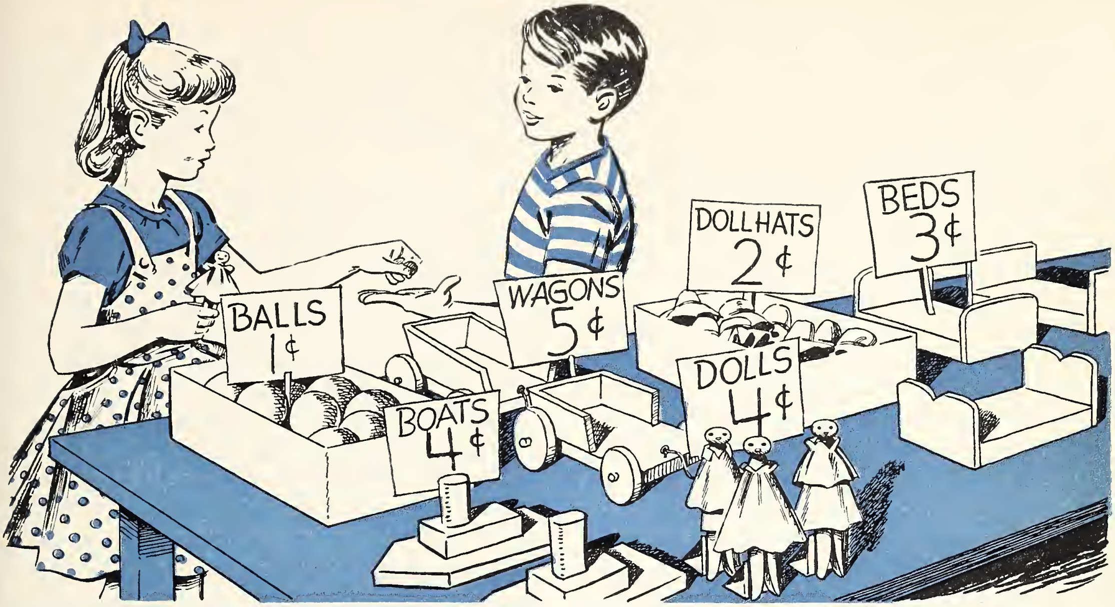
Tom will buy a boat for 4 cents.
Then he will buy a toy for 2 cents.
How much will he pay?

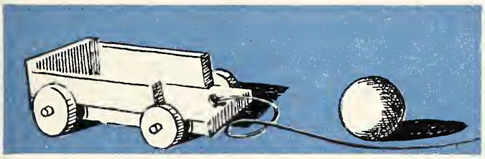
Bill will buy a wagon for 3 cents.
Then he will buy a ball for 3 cents.
How much will he pay?

Enrichment activities. The faster learners who do not require the teacher's help at this time may write number stories, using pictures instead of words for the items to be bought, as:

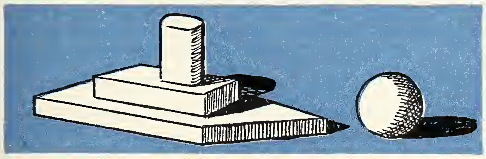
Buy a for 4 cents.
Buy a for 2 cents.
How much will you pay? 6 ¢

Buy a for 2 cents.
Buy a for 3 cents.
How much will you pay? 5 ¢

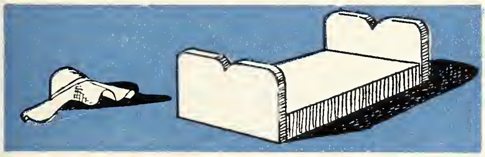




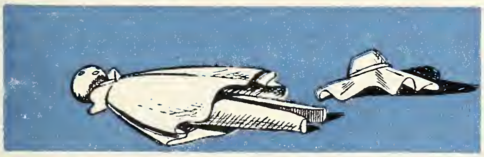
Buy a ball for 1 cent.
Buy a wagon for 5 cents.
How much will you pay? ______¢



Buy a ball for 1 cent.
Buy a boat for 4 cents.
How much will you pay? ______



Buy a hat for 2 cents.
Buy a bed for 3 cents.
How much will you pay? ______



Buy a doll for 4 cents.
Buy a hat for 2 cents.
How much will you pay? ______

Buy a doll for 4 cents.
Buy a ball for 1 cent.
How much will you pay? ______

LEARNING TO SUBTRACT

The pupils who have completed the earlier work successfully are ready for the telescoped reteaching of subtraction. The plan for this work, which is similar to that used in reteaching addition, is described below.

Learning More about Groups

Concrete objects are used first to develop the concept that a group may be separated into two smaller groups or into 1 and a smaller group. Then (as on page 29 in the pupil's book) pictures of groups of objects are analyzed to find first the number in the whole group and next the number in each of two smaller groups which can be identified within the larger group. These experiences serve the purpose of extending and enriching understanding of the numbers 2 to 6. They serve also to develop readiness for subtraction by emphasizing first the whole group (minuend) and then the subgroups (subtrahend and remainder).

The work with groups parallels the 15 subtraction facts with minuends of 6 or less which are to be retaught.

The terms *more, less,* and *fewer* are developed in connection with groups of objects. These terms, which are part of the language of subtraction, help to develop an understanding of the process.

Dramatizing the Meaning of Subtraction

Dramatization of realistic number stories told by the teacher is the first step in helping children understand the meaning of subtraction. As the children play the number stories, they actually see the subtraction taking place.

The next step is to make the transition from actual dramatization with concrete objects to illustrated demonstration of the meaning of subtraction. For this step, the teacher first interprets a pictured number story which calls for subtraction, and the children find the answer. At this stage, two pictures are used to illustrate each number story. (See page 30 in the pupil's book.) The first picture shows the minuend—the whole group. The second picture shows the subtraction taking place—the group in the act of separating. In this picture the children can identify the smaller group that will be left after the subtraction is completed—the answer—as well as the group being subtracted—the subtrahend. This step parallels, in pictures, the actual dramatization of the subtraction process which has previously taken place in the classroom. Thus the development of subtraction proceeds from the concrete to the semiconcrete stage.

The objects in the two pictures have identity so that the pupils can recognize that those being subtracted and the remainder are the same objects as those in the total group and not different groups. Only under such conditions may the subtrahend and the remainder be illustrated. In all other situations *only* the minuend may be illustrated. In subtraction, a group is taken from the larger group. This smaller group is already present, and cannot be pictured again.

The reverse of the story situations used to develop the addition concept are used to introduce subtraction, in order to help the children understand the relationship between the two processes. In introducing addition, two groups were shown combining. Now the same two groups are shown in the process of separating. For example, a story like this was used to introduce addition:

Two girls were picking flowers. Two more girls came to pick flowers. How many girls were picking flowers then?

The same situation reversed for subtraction becomes:

Four girls were picking flowers. Two of the girls went away. How many girls were picking flowers then?

In subtraction the greatest difficulty which the children meet is learning to think of the whole group first and then of its two smaller components. To help them take this step, small pictures of the whole group are provided. The children "take away" those which are to be subtracted by marking them out. In this way the pupil sees the minuend, takes away the subtrahend, and discovers for himself the remainder. As he does so, he gets an understanding of the idea of taking away and finding how many are left.

Learning Subtraction Facts

Next, the children learn the subtraction fact which was introduced in, and illustrated by, the number story. They use numbers and words to describe the fact; for example: 2 girls from 4 girls is 2 girls.

The word *minus* is not used at this time in stating subtraction facts. The words *from* and *take away* are used instead because they are more meaningful to children.

Using the Facts in Stories and Examples

After the facts have been introduced, three to five at a time, they are used in illustrated number stories which are stated orally by the teacher. (See page 31 in pupil's book.) The pupils write the example in vertical form, using words to tell what the numbers mean, as:

$$\begin{array}{l} 3 \text{ boats} \\ \underline{2 \text{ boats}} \\ 1 \text{ boat} \end{array}$$

Since the addition and subtraction processes have not yet been brought together, there is no need for the minus sign. The sign will be introduced later when the transition is made to abstract examples and after the relationship between addition and subtraction has been developed.

In this section of the pupil's book the 15 subtraction facts with minuends of 6 or less are introduced. These are the reverse of the 15 addition facts previously introduced.

Reading and Solving Problems

The skills needed in reading and solving problems (number stories) which were developed in connection with addition are applied to subtraction. Number stories which involve subtraction facts just learned are provided for the pupils to read and solve. The vocabulary used in these number stories is introduced gradually, and carefully built up, so that every child can read the stories easily.

Other Topics

Exercises which develop the meaning of the terms *first, next,* and *last,* and a page which introduces telling time to the hour are also included in this section.

FINDING SMALLER GROUPS WITHIN A LARGER GROUP

Preparatory Activities for Pupil's Book, Page 29

The purpose of page 29 is to help the children identify within groups of 2, 3, or 4 objects, the smaller groups that make up each larger group. They learn to find the number in the whole group, and then focus their attention upon the parts of the group. This experience is very important in learning to subtract. As the children work with the exercises, they discover groups that parallel the subtraction facts having minuends of 2, 3, and 4. The terms *more* and *the same* are reviewed, and *fewer* is introduced orally.

Using concrete materials. Concrete experiences such as the following should be provided for the work with groups before page 29 in the pupil's book is used:

Have 2 children come to the reading table. Have 1 of them sit and 1 stand beside the table. Then ask the children how many are at the table. Next ask: "How many are standing? How many are sitting?" Ask if more are standing than sitting to develop the idea that the same number of children are standing as are sitting.

Finding Smaller Groups within a Larger Group (continued)

Next, ask 3 boys to go to the blackboard. Have 1 boy drawing a picture and 2 boys watching. Then ask the children to answer these questions:

How many boys are in the group? How many are drawing? How many are watching? Are there more boys drawing or watching? Are there fewer watching or drawing?

Ask 3 girls to go to a window. Have 2 girls pretend to dust the window, and have 1 girl look out the window. Then ask:

How many girls are at the window? How many are dusting? How many are looking out?

Develop the terms *more* and *fewer* again.

Now have 4 children come to the teacher's desk. Let 2 children pretend to straighten the books or papers while the 2 others watch. Then ask:

How many children are at the desk? How many are working? How many are watching? Are there fewer watching than working? Are the two groups the same size?

Small concrete objects may now be used to develop the concepts outlined above. For example, say to the pupils:

Place 4 blocks on your desk. Now push 2 aside. How many blocks are on the desk? How many are at the left side? How many are at the right side?

Place 3 blocks on your desk. Now move 1 block away from the group. How many were on the desk in all? How many did you take away? How many are left in the group?

Repeat the procedure for 2 from 3 and 1 from 2, continuing to develop the terms *more, the same,* and *fewer.*

Using Page 29

Make sure that the children can read the questions. Then explain that they are to read each question and write the number that tells the answer.

The work should be supervised carefully to make sure that the children find first the total number of boats in each picture. This will aid them in learning to write the minuend at the top when subtraction examples are introduced.

Then have them find how many of the boats are blue, and next how many are not blue. The order is important since it parallels the procedure in subtraction.

After the work is completed, let the children compare the pictures to strengthen their concepts of *more, the same, fewer.* Such questions as these might be used:

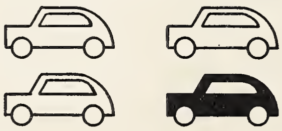
Are there *more* or *fewer* boats in the second picture than in the first?

Which pictures have the *same* number of boats?

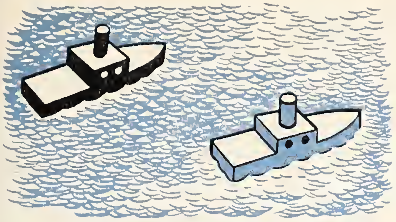
Follow-up Activities

Additional learning helps. If some of the pupils had difficulty with the exercise on page 29, study their work and talk with them to find the cause of the difficulty. If it is failure to understand groups, the concrete experiences suggested as preparatory activities should be continued. If the difficulty is one of reading, help should be given with reading the questions in the book and answering them, one at a time and in sequence.

Enrichment activities. Those children who do not need further help from the teacher may make pictures of three or four objects and color some of the objects one color and some another. They may then write stories to tell what they drew, as:



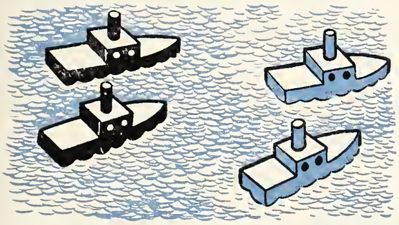
I drew 4 cars.
3 cars are white.
1 car is black.



How many boats are in the water? 2

How many of the boats are blue? 1

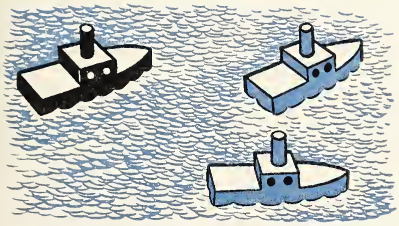
How many are not blue? 1



How many boats are there? ____

How many are blue? ____

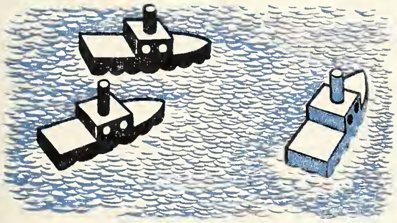
How many are not blue? ____



How many boats are there? ____

How many are blue? ____

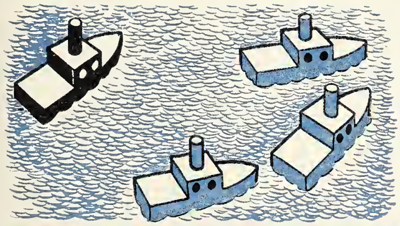
How many are not blue? ____



How many boats are there? ____

How many are blue? ____

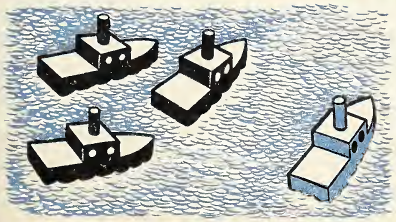
How many are not blue? ____



How many boats are there? ____

How many are blue? ____

How many are not blue? ____



How many boats are there? ____

How many are blue? ____

How many are not blue? ____

INTRODUCTION TO SUBTRACTION

Preparatory Activities

The pictures on page 30 illustrate oral number stories which serve to develop the meaning of subtraction and to introduce three subtraction facts: 2 from 4 is 2, 2 from 3 is 1, and 1 from 3 is 2. The children discover each fact for themselves by marking out some of the pictures in a group.

Dramatizing subtraction facts. Concrete experiences which demonstrate what we mean by subtraction should be provided. For example, the teacher may give orally a number story such as the following, which uses the fact 2 from 4 is 2, and have the children dramatize it.

Four girls were dusting the books. Two of the girls went to their desks. How many girls were dusting then?

Then the teacher should help them state the subtraction fact, "2 girls from 4 girls is 2 girls," and write it on the blackboard.

Similar stories may be used for dramatization of the other two facts: 2 from 3 is 1, and 1 from 3 is 2.

Demonstrating subtraction facts with concrete objects. Next, the children should discover the new facts in response to such directions as the following:

Place 4 crayons on your desk. Take 2 crayons away. How many are left?

Place 3 crayons on your desk. Take 1 crayon away. How many are left?

Place 3 crayons on your desk again. Take 2 away. Now how many are left?

Again, each fact should be stated orally and written on the blackboard in horizontal form.

This definition of subtraction may be given: "We subtract when we take one or more from a group and find how many are left. We call this subtraction."

Using Page 30

Explain that at the top of the page the first picture shows the beginning of a story. The next shows what is happening in the story. Then tell the story:

Four girls were picking flowers. Two of the girls went home. How many girls were picking flowers then?

Have the children read the words below each picture, and then write in the blank at the right the number that tells how many are left. Next, they are to read the direction line, mark out 2 of the girls as indicated by the dotted lines, and then write in the blank the answer to the example.

Use the same procedure with the remaining pictures, telling these or similar stories:

Three dogs were barking up a tree. Two of the dogs ran away. Then how many dogs were barking up the tree?

Three boys were walking on a log. One boy went away. How many boys were on the log then?

Follow-up Activities

Additional learning helps. If some of the children had difficulty with page 30, exercises such as the following may be written on the blackboard and the children asked to mark out pictures to discover the answers.

Take 2 trees from 4 trees.

2 trees from 4 trees is ______ trees

Enrichment activities. The children who do not need additional help may make pictures to illustrate the new facts, placing the pictures beside the minuend. The numbers will be arranged in example form, as:

3

1 dog
______

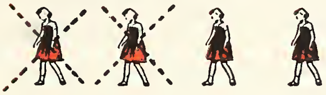
1 dog from 3 dogs is 2 dogs

4 girls

2 girls went away

____ girls left

Take 2 girls from the 4 girls.



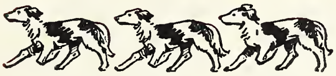
2 girls from 4 girls is ____ girls

3 dogs

2 dogs went away

____ dog left

Take 2 dogs from the 3 dogs.



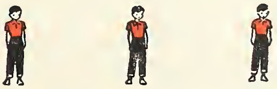
2 dogs from 3 dogs is ____ dog

3 boys

1 boy went away

____ boys left

Take 1 boy from the 3 boys.



1 boy from 3 boys is ____ boys

USING SUBTRACTION

Preparatory Activities

On page 31 the subtraction facts introduced on the preceding page are used in illustrated oral number stories and in examples, with the transition being made to examples in vertical form.

Dramatization. Dramatization will help the pupils make the transition to oral number stories which are illustrated by only one picture instead of two pictures. The facts that were introduced on the preceding page should be used in the stories; for example:

John had 3 books. He gave 1 book to Jerry. How many books did John have left?

Have the children dramatize only part of the story. John may be holding 2 books and handing 1 book to Jerry. Ask the children how many books there are in the story. Help them think "3 books," even though they see 2 books and 1 book. Thinking of the 3 books—the minuend—is an important and difficult step in subtraction.

Then ask how many books John will have left after he gives Jerry 1 of the books. Thinking of the action as completed is another difficult step for children. Demonstrate the step if necessary.

Next, help the children write the example in vertical form. They must learn to write the minuend at the top in the example. Write on the blackboard:

	books
Take 1 book from 3 books.	book
Tell how many are left.	_books

Have a child write the 3 at the top and the *1* under it. Explain that we take the smaller number from the larger number. Have them subtract and write the answer.

Dramatize number stories in the same way for the facts 2 from 4 is 2, and 2 from 3 is 1. Help the children to write the examples in vertical form each time.

Using Page 31

Tell the story of the first picture:

Three boats were tied up at the pier. Two of the boats sailed away. How many boats were left at the pier?

Ask the children how many boats are in the picture. Have them think what happened in the story, and then ask how many boats were left at the pier.

Have the children read the sentences below the picture and trace the numbers in the example. Then have them "take away" and write the answer.

Help them see that in the example the larger number is written at the top.

Follow the same procedure with the other pictures. The stories shown by the pictures may be told as follows:

Four airplanes were at the airport. Two of them took off and flew away. How many airplanes were left at the airport?

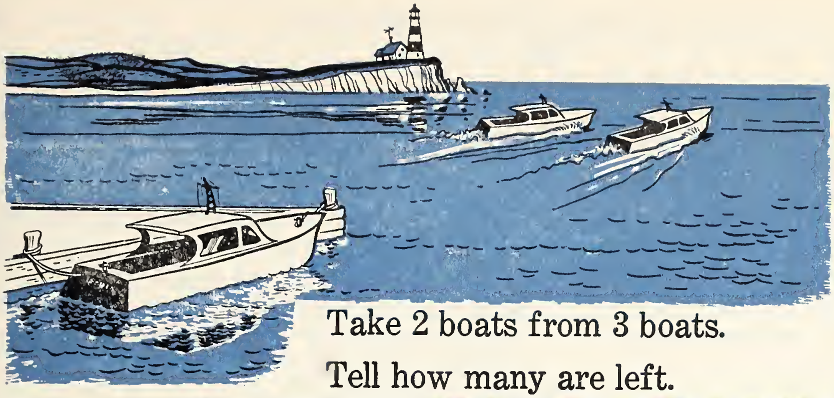
Three wagons were in the orchard. A man drove 1 of the wagons out of the orchard. How many wagons were in the orchard then?

Make sure the children understand the direction line at the bottom of the page. Then ask them to subtract and write the answers to the examples.

Follow-up Activities

Additional learning helps. If some of the children had difficulty with the stories and pictures on page 31, have them dramatize similar stories. At first they may play the entire story, but gradually they should be helped to interpret the stories with only a partial dramatization.

Some children may have failed to understand the relationship between directions such as: "Take 2 boats from 3 boats. Tell how many are left" and the examples to be traced and completed. These children should be given more help in this skill as suggested under the preparatory activities.



Take 2 boats from 3 boats.

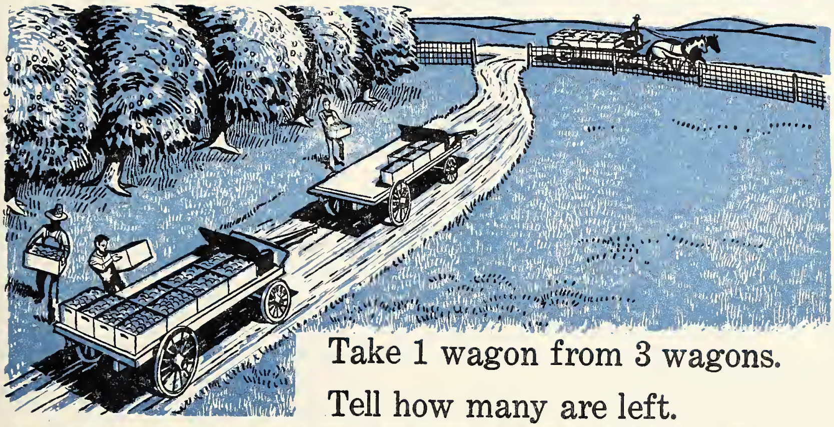
Tell how many are left.

3 boats
2 boats
___ boat

Take 2 airplanes from 4 airplanes.

Tell how many are left.

4 airplanes
2 airplanes
___ airplanes



Take 1 wagon from 3 wagons.

Tell how many are left.

3 wagons
1 wagon
___ wagons

Take away, and tell how many are left.

3 beds
2 beds
___bed

4 chickens
2 chickens
___chickens

3 hats
1 hat
___hats

LEARNING MORE SUBTRACTION FACTS

Preparatory Activities

Page 32 introduces the facts 1 from 2 is 1, 1 from 4 is 3, and 3 from 4 is 1 in picture stories, supplemented by exercises in which the children discover each fact by marking out a smaller from a larger group of objects.

Dramatization. Dramatization should be used to introduce the new facts and to demonstrate again what we mean by subtraction. These stories are suggested:

Two apples were on the table. Mary took 1 of them. How many apples were left on the table?

Four pictures were on the wall. One of the pictures fell. How many pictures were on the wall then?

Four chairs were at the reading table. Sarah took 3 of the chairs away. Then how many chairs were at the table?

Only part of the story should be dramatized. For example, in the first story Mary may go to the table and pick up an apple. However, she should not remove it from the scene. The children should imagine the action as completed and think the answer to the question in the story.

Each fact should next be developed with small concrete objects. The teacher will say:

Place 4 cards on your desk. Take away 1 card. How many are left?

The same procedure may be followed for the facts 3 from 4 is 1, and 1 from 2 is 1.

Using Page 32

Again on this page two pictures are provided to illustrate each number story. The children study the second picture to find the answer to the question in the story. The procedure for discovering the answer for the example by marking out pictures is the same as that suggested for page 30. The following stories may be told to introduce the new facts:

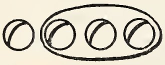
Two ducks were swimming in the water. One duck came out of the water. Then how many ducks were swimming?

Four kittens were playing with a ball of yarn. Three of them got tired and went away. Then how many kittens were playing with the yarn?

Four rabbits were eating carrots in a garden. One of the rabbits ran out of the garden. How many rabbits were in the garden then?

Follow-up Activities

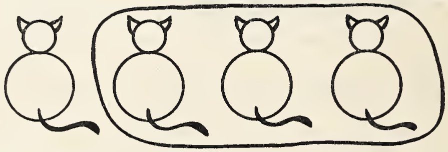
Additional learning helps. If the slower learners had difficulty, they should be given more experiences with dramatization and with concrete materials as suggested under the preparatory activities. Then they should be provided with pictures of objects to use in finding answers to complete the facts. The examples and pictures can be arranged on cards.



4
3 balls

3 balls from 4 balls is_____ball

Enrichment activities. The faster learners may illustrate the new facts on art paper for their folders or scrapbooks. Some of the children may wish to write and illustrate number stories using the new facts, as:

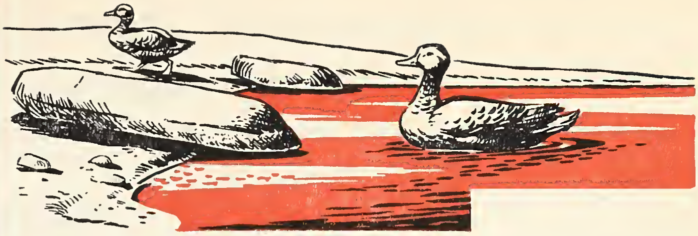


Mary's cat had 4 kittens.

Mary gave 3 of them away.

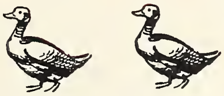
How many kittens did she keep?

2 ducks



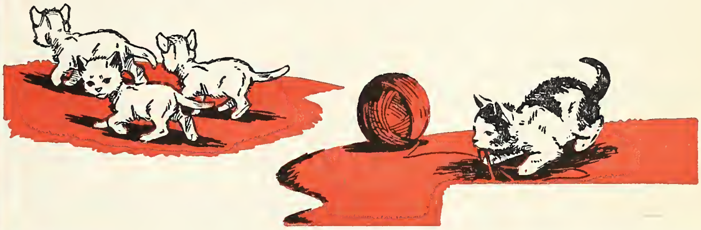
1 duck went away ____ duck left

Take 1 duck from the 2 ducks.



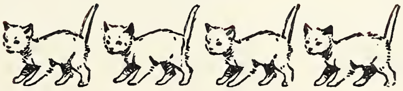
1 duck from 2 ducks is ____ duck

4 kittens



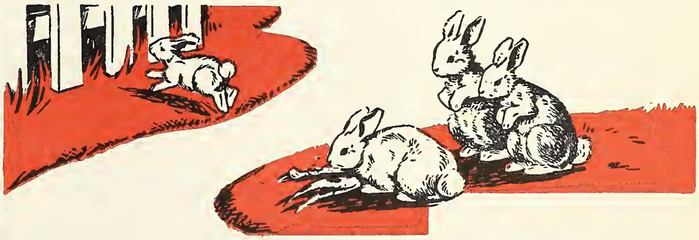
3 kittens went away ____ kitten left

Take 3 kittens from the 4 kittens.



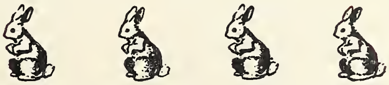
3 kittens from 4 kittens is ____ kitten

4 rabbits



1 rabbit went away ____ rabbits left

Take 1 rabbit from the 4 rabbits.



1 rabbit from 4 rabbits is ____ rabbits

USING NEW FACTS IN STORIES AND EXAMPLES

Preparatory Activities

On page 33 the subtraction facts just introduced are used in oral number stories and in practice examples. Two of the facts learned earlier (2 from 4 is 2, and 2 from 3 is 1) are used in the practice examples also.

Reviewing terms. The teacher should emphasize again that the larger number is written at the top in a subtraction example or fact. To prepare for this step, the terms *larger* and *smaller* as they apply to numbers and groups should be reviewed.

Build groups of 2, 3, and 4 concrete objects; then redevelop the idea that a group of 4 is larger than a group of 2, so we say that 4 is a larger number than 2.

Compare the numbers 1, 2, 3, and 4 to give the children opportunities to use the concepts. For example: Is 2 larger than 1? Is 3 smaller than 4? Which is larger, 2 or 3? Which is smaller, 1 or 3?

Write several examples on the blackboard in horizontal form. Then help the children decide how to write them in vertical form, as:

2 dolls from 4 dolls is______dolls

dolls
dolls
_____ dolls

Ask the children which number should be written at the top in the example. Let them write it. Ask them which number should be written next, and have them complete the example. Then explain that in subtraction we read the example from the bottom to the top. We say, "2 dolls from 4 dolls is 2 dolls."

Repeat the activity with other facts until it is certain that the children understand why the examples in their book are written as they are. Make certain also that the children can read the examples correctly.

Using Page 33

Tell this story for the first picture:

Four chickens were sitting on a log. One of the chickens hopped off the log. How many were on the log then?

The children are to read the lines below the picture, trace the numbers in the example, and write the answer.

The same procedure should be followed for each of the other pictures. The following stories are suggested:

One day 2 hens were on nests in the chicken house. One hen jumped off and went away. How many hens were left on the nests?

One day 4 ducks were on the shore of a lake. Three of the ducks flew away. How many ducks were left on the shore?

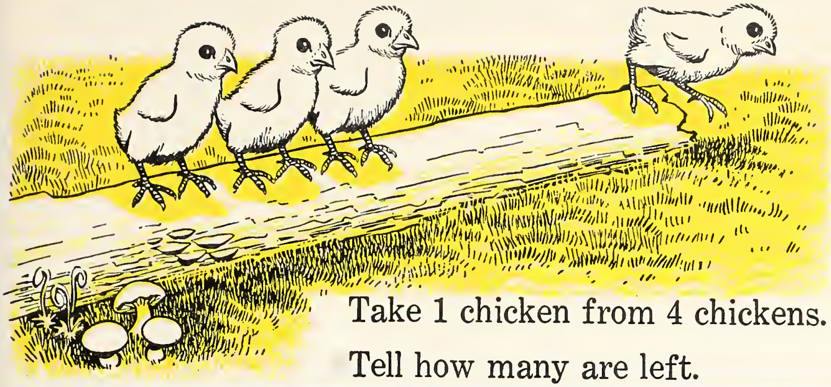
Before the children do the row of examples at the bottom of the page, be sure they understand that they are to take the smaller number from the larger number and tell how many are left.

Follow-up Activities

Additional learning helps. If some of the children had difficulty with page 33, the teacher will need to find exactly what caused the trouble. Some of them may confuse subtraction with addition, in which case further demonstration of what subtraction means may be helpful. This can be done with dramatization, manipulation of objects, and drawings to be marked out.

Enrichment activities. The faster learners may draw pictures to illustrate the new facts they have learned, as:

2 trees
1 tree
1 tree



Take 1 chicken from 4 chickens.

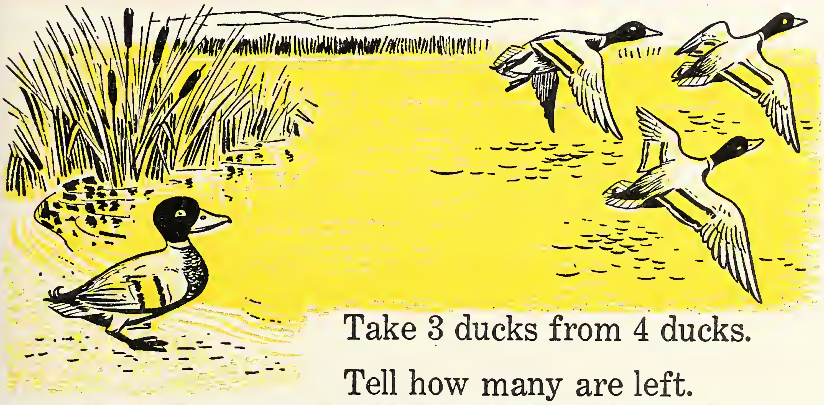
Tell how many are left.

4 chickens
1 chicken
____ chickens

Take 1 hen from 2 hens.

Tell how many are left.

2 hens
1 hen
____ hen



Take 3 ducks from 4 ducks.

Tell how many are left.

4 ducks
3 ducks
____ duck

Take away, and tell how many are left.

4 hats	4 dolls	3 balls	4 cakes	2 toys
2 hats	1 doll	2 balls	3 cakes	1 toy
____hats	____dolls	____ball	____cake	____toy

USING SUBTRACTION FACTS IN NUMBER STORIES

Preparatory Activities

The exercise on page 34 presents in problems some of the subtraction facts the children have learned. The stories are illustrated by small drawings of objects which the children cross out to help them find the answers to the questions in the problems.

Reading problems. Many opportunities have been provided for the children to dramatize number stories told by the teacher. Also a reading vocabulary that will enable the children to read number stories has been built gradually. However, some preparatory experiences in reading and solving problems should be given as readiness for page 34. For example, write on the blackboard the following story:

Three girls were playing with dolls. One of the girls went home. How many girls were playing then?

Have the children read the story silently, and then have someone draw a picture of 3 girls on the blackboard. Have the children mark out 1 of the girls to show what happened in the story, and write the number that answers the question. The drawings may be lines or squares or dots if the children find it difficult to draw girls.

Note that the question asks, "How many *girls* were playing then?" The answer is 2—not 2 girls.

These or similar stories may be used in the same way:

Two ponies were playing in a field. One pony ran away. How many ponies were left?

Four little cakes were in a box. John ate 3 of the cakes. How many of the little cakes were left?

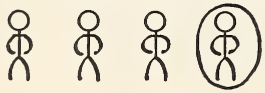
Using Page 34

Make sure that the children can recognize all of the words in the number stories. Help them see how the picture of 4 ponies is related to the first number story. Have them trace the dotted lines to mark out 1 of the ponies, and write the answer.

Then have the children read each story silently, mark out the number of objects the story tells them to, and write the answer. Since this is a learning situation, the teacher should give help to individuals as they need it.

Follow-up Activities

Additional learning helps. If any of the children had difficulty in reading the problems on page 34, they should be helped to read similar stories sentence by sentence. Pictures may be drawn for each story, and objects to be taken away marked out, as:



Four boys were playing.
One of the boys went home.
How many boys were playing then?

If the children cannot remember the whole story, they should make a response to each sentence. For example, have them read the first sentence and make a picture to show how many boys were playing. Then have them read the next sentence and mark out the number of boys who went home. Finally, have them read the question and write the number that tells how many boys were left.

Enrichment activities. The children who do not need help may write and illustrate subtraction stories, using the facts they have learned. For example:

Three cats were playing.
One cat went away.
How many cats were playing then?

Four ponies were eating from a box.
One of the ponies went away.
How many ponies were eating then? ____

Three kittens were playing in the doll bed.
One of the kittens jumped out of the bed.
Then how many kittens were in the bed? ____

Four rabbits were playing in a box.
Three of the rabbits jumped out.
How many rabbits were in the box then? ____

Four dogs were playing with a ball.
Two of the dogs went away.
Then how many dogs were playing? ____

Three boys were playing with toys.
Two of the boys went away.
How many boys were playing then? ____

FINDING SMALL GROUPS WITHIN A GROUP OF FIVE

Preparatory Activities

The purpose of the exercise on page 35 is to enable the pupils to discover smaller groups within groups of 5 in preparation for learning the subtraction facts with minuends of 5.

These experiences with groups of 5 contribute also to the children's understanding of the number 5.

Dramatization. Experiences such as the following should be provided before the children work with the pictured objects on page 35.

Arrange 5 children at a game table. Have 4 children playing a game and 1 child watching. Ask:

How many children are at the table? How many are playing the game? How many are watching?

Rearrange the children so that 1 is playing and 4 are watching. Ask the same questions in the same order.

Rearrange the children again so that 3 are playing a game and 2 are watching. Ask:

How many children are at the table? How many are playing the game? How many are watching?

Repeat the exercise with 2 children playing the game and 3 watching.

Using concrete objects. Small concrete objects, such as blocks, may be used next to develop the concepts about 5. For example, say to the pupils:

Place 5 blocks on a piece of paper. Now take 4 blocks off the paper. How many blocks are on the paper? How many are off the paper?

Place the 5 blocks on the paper again. Now take 1 block off the paper. How many blocks are on the paper? How many blocks are off the paper?

Repeat the exercise with 5, 3, and 2 and with 5, 2, and 3.

Using Page 35

In each exercise the question "How many airplanes are there?" is stated first to direct attention to the whole group in the picture. The next two questions call attention to the small groups within the larger group.

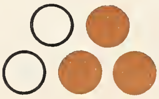
Care should be taken to make sure that the children understand that they are to study the picture to find the answer to the first question, then the next, and then the last question in the exercise.

The answer to each question is to be written on the blank at the right of the question.

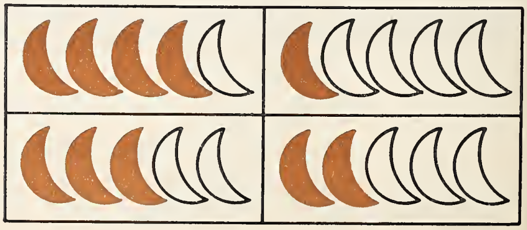
Follow-up Activities

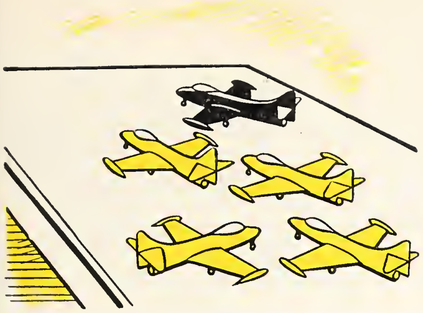
Additional learning helps. If some of the children had difficulty in analyzing the groups on page 35, the preparatory activities should be continued. If they were unable to read the questions and study the pictures to find the answers, it will be helpful to write on the blackboard exercises such as the following, and help the children individually to work through them.

How many balls are there?
How many are brown?
How many are not brown?



Enrichment activities. Those children who do not need the teacher's help may make a design using groups of 5 objects, coloring some to show the different small groups within the groups of 5, as indicated on page 35 in their books.

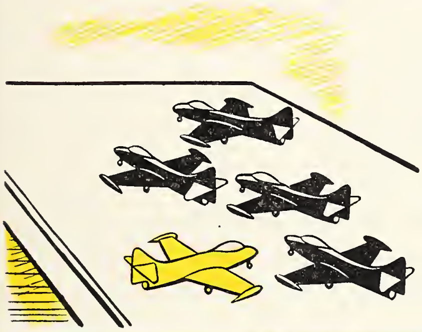




How many airplanes are there? ______

How many of the airplanes are yellow? ______

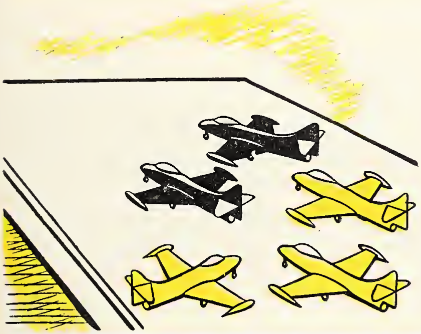
How many are not yellow? ______



How many airplanes are there? ______

How many are yellow? ______

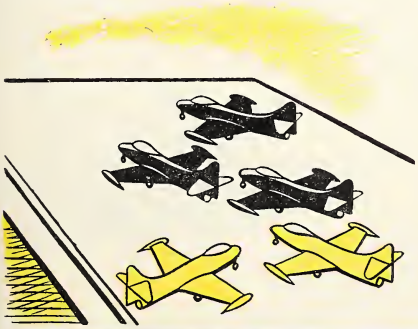
How many are not yellow? ______



How many airplanes are there? ______

How many are yellow? ______

How many are not yellow? ______



How many airplanes are there? ______

How many are yellow? ______

How many are not yellow? ______

LEARNING FOUR MORE SUBTRACTION FACTS

Preparatory Activities

On page 36 the facts 4 from 5 is 1, 1 from 5 is 4, 3 from 5 is 2, and 2 from 5 is 3 are introduced. At this time the transition is made to the use of one picture rather than two pictures to introduce each new subtraction fact. This means that the children must visualize the minuend of the new fact, as it no longer is pictured for them.

Dramatization. The following story may be dramatized by the children to introduce the first new fact:

Five boys were making a house. Four of them went away. How many boys were making the house then?

Arrange 5 boys in the front of the room. Have 1 pretending to build a house. Have 4 just ready to leave the scene. The children will think how many boys will be left when the 4 boys go away.

The teacher may help them discover the answer by saying, "Five boys. Four will go away. How many will be left?"

After the answer for the question is given, write the fact, 4 boys from 5 boys is 1 boy, on the blackboard. Then write the example in vertical form as shown at the right.

5 boys
4 boys
__ boy

Ask a child to read the example and write the answer. Point out to the children that we *always* write the larger number at the top in subtraction examples.

The same procedure should be used to introduce the facts 1 from 5 is 4, 3 from 5 is 2, and 2 from 5 is 3.

Using concrete objects. The children should also discover the new facts with small concrete objects at their desks. The teacher may say:

Place 5 crayons on your desk. Take 4 away. How many are left? Four crayons from 5 crayons is how many crayons?

Follow the same plan for the facts 1 from 5 is 4, 3 from 5 is 2, and 2 from 5 is 3. Again, write each example on the blackboard in vertical form.

Using Page 36

On this page the pupils study one picture to find the answer which will complete the statement of the fact. After they write the answer in the blank, they write the example in vertical form and find the answer by subtracting.

Since models are not provided for the third and fourth exercises, careful supervision will be needed to make sure that the children write the larger numbers at the top in the vertical examples. These stories may be used:

One day Mary was feeding milk to 5 kittens. Four of the kittens went away. Then how many kittens were left?

Bill was playing with his 5 pet rabbits. One rabbit hopped away. How many rabbits were left then?

Five cows were standing under a straw stack. Three cows went away. How many cows were left under the straw stack?

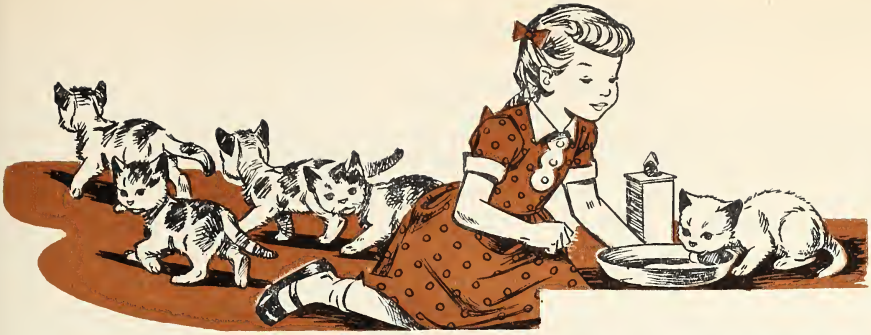
Five hens were eating corn. Two of the hens went away. Then how many hens were eating corn?

Follow-up Activities

Additional learning helps. If some of the children had difficulty in doing the work on page 36, they should be given more experiences with dramatization and with concrete objects. It will be helpful also to have them make cards such as the following which can be used to study the facts.

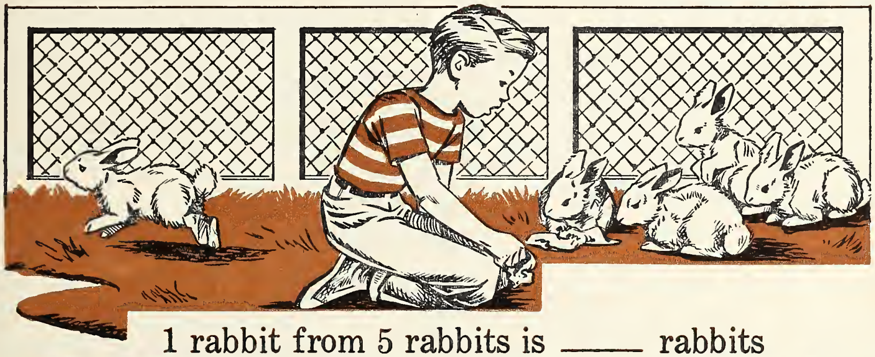
5
3 trees
____

3 trees from 5 trees is ____trees



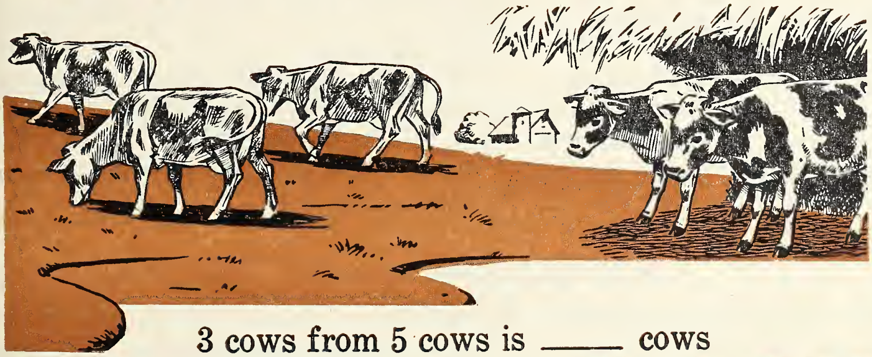
5 kittens
4 kittens
____ kitten

4 kittens from 5 kittens is ____ kitten



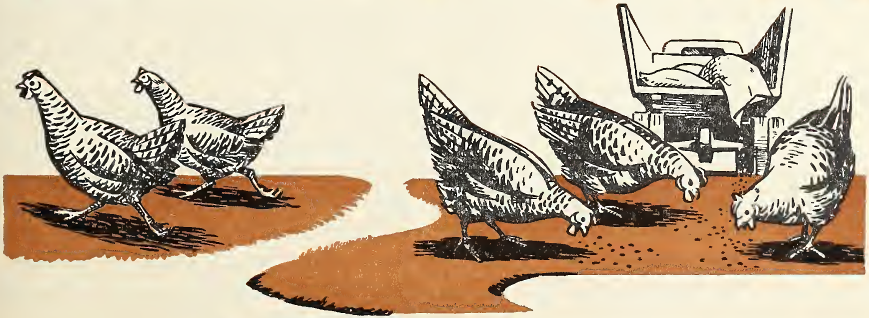
5 rabbits
1 rabbit
____ rabbits

1 rabbit from 5 rabbits is ____ rabbits



cows
____ cows
____ cows

3 cows from 5 cows is ____ cows



hens
____ hens
____ hens

2 hens from 5 hens is ____ hens

USING THE NEW FACTS IN STORIES AND EXAMPLES

Preparatory Activities

The five number stories at the top of page 37 provide practice on 5 of the subtraction facts that have been introduced. The examples at the bottom of the page provide practice on all ten of the subtraction facts the children have learned.

Playing store. Playing store is an excellent preparatory activity for the number story exercise. An activity such as that described below might be carried out, with toy or actual pennies used to help demonstrate the subtraction. The children pretend they are paying for the things bought and show how many cents they have left as they dramatize stories such as the following:

Susan had 5 cents. She paid 2 cents for a pencil. How much money did she have left?

All of the ten subtraction facts may be used in dramatizations of stories if the children need more practice on the facts. The stories may be given orally by the teacher, but a few should be written on the blackboard to give the children practice in reading.

In order that the children will not be confused by the change from third person to second person in the number stories, both types should be included in the stories written on the blackboard, as:

Bob had 4 cents.
He paid 2 cents for a ball.
How much money did he have left?

You have 3 cents.
Buy a hat for 2 cents.
How much money will you have left?

Using Page 37

Explain to the children that they are to read each number story and write the answer in the blank. Explain also that the pictures of the pennies will help them.

Remind the children that they are to write the cent sign whenever the answer means cents. When they have written the answer to the first number story, ask them if they wrote the cent sign.

It may be advisable to have the children read the first story orally and discuss it. Then they should be able to read the others without assistance.

Before the children do the examples at the bottom of the page, read, or have a child read, the direction orally and explain what it means. Then they may write the answers to the ten examples.

Follow-up Activities

Additional learning helps. By studying each child's response to the problem solving exercise on page 37, and by having him explain what he did as he solved the problems, the teacher will learn what caused mistakes. If it is a reading difficulty, help can be given in reading similar number stories written on the blackboard.

A diagnosis of the children's responses to the practice examples will reveal which children, if any, do not know the subtraction facts introduced so far. By discussing the work with each child who had difficulty, the teacher will find whether he is confusing addition and subtraction, or whether he has failed to learn the facts. Help can then be given to overcome the difficulty. This will probably take the form of dramatization to explain the subtraction process or the use of concrete materials and practice to learn the subtraction facts.

Enrichment activities. The faster learners may write number stories similar to those in their books. These may be illustrated by pictures of pennies.

The children should illustrate only the money there was before some was spent. The subtraction can be shown by marking out some of the pennies, *not* by drawing *more* pennies.

John had 5 cents.
He paid 1 cent for a ball.
How much money did he have left? ______

Bob had 3 cents.
He paid 2 cents for a hat.
How much money did he have left? ______

Dick had 5 cents.
He paid 3 cents for a boat.
How much money did he have left? ______

You have 4 cents.
Buy a hat for 2 cents.
How much money will you have left? ______

You have 5 cents.
Buy a doll for 4 cents.
How much money will you have left? ______

Take away, and tell how many are left.

3 dolls	5 wagons	4 pigs	5 ponies	2 hats
2 dolls	4 wagons	1 pig	3 ponies	1 hat
____doll	____wagon	____pigs	____ponies	____hat
5 dogs	3 boats	4 hens	5 balls	4 ducks
2 dogs	1 boat	3 hens	1 ball	2 ducks
____dogs	____boats	____hen	____balls	____ducks

FINDING SMALL GROUPS WITHIN A GROUP OF SIX

Preparatory Activities

The purpose of page 38 is to help the children identify within groups of 6 the smaller groups that make up each larger group. As the children work with the exercise, they discover groups that parallel the subtraction facts with minuends of 6, and they extend their understanding of the number 6.

Providing concrete experiences. Concrete experiences such as the following will help the children discover all of the group arrangements within a group of 6.

Ask 6 children to go to the front of the room. Arrange the children with 5 at the blackboard and 1 at a table. Ask:

How many children are at the front of the room? How many are at the blackboard? How many are at the table?

Rearrange the children so that 1 child is at the blackboard and 5 children are at the table. Ask the same three questions.

Repeat the activity, arranging the 6 children in groups of 4 and 2, 2 and 4, and 3 and 3. Each time ask:

How many children are at the front of the room? How many are at the blackboard? How many are at the table?

Using concrete objects. Next, have the children repeat the experiences at their desks, using their small concrete objects such as milk bottle caps.

Say to the children:

Place 6 caps on your desk. Now put your right hand over 3 caps and your left hand over the others. How many caps are on the desk? How many are under your right hand? How many are under your left hand?

Now place the 6 caps together again. Put 5 caps under your right hand and the other under your left hand. How many caps are on the desk? How many are under your right hand? How many are under your left hand?

Repeat the procedure with 1 and 5, 4 and 2, and 2 and 4.

Using Page 38

Through discussion, help the children see that in each picture some of the cupcakes have yellow icing and some have white icing.

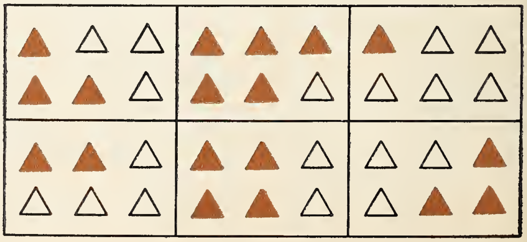
Make sure that the children can read the questions. Then explain that for each exercise they are to count all of the cakes in the box and write the number in the first blank. Then they are to find how many of the cakes are yellow and write the number in the next blank. And finally they are to find how many of the cakes are white and write the number in the last blank.

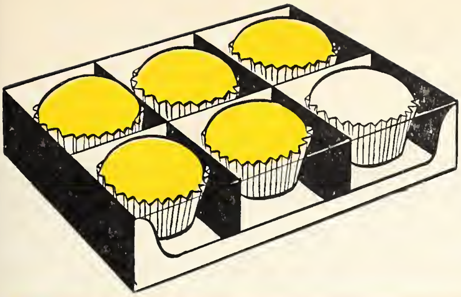
Follow-up Activities

Additional learning helps. If some of the children had difficulty in reading and finding the answers to the questions on page 38, the teacher may work through the page with them, either individually or in a small group where she can direct each step.

If some had difficulty in analyzing the groups in the pictures, they should be given additional experiences with dramatization or with small concrete objects, as suggested for preparatory activities.

Enrichment activities. The children who do not need additional help from the teacher may be allowed to do other things while the teacher works with the slower learners. Or they may make designs with 6 objects, using color to show the different small groups within the group of 6.

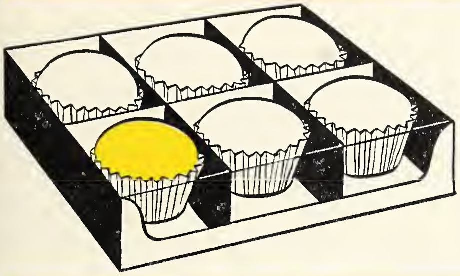




How many cakes are there? ____

How many of the cakes are yellow? ____

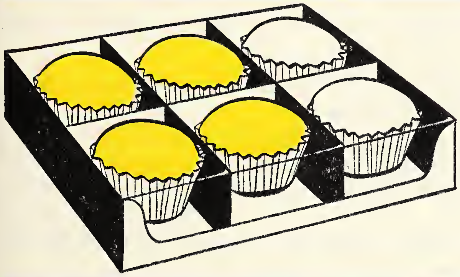
How many are white? ____



How many cakes are there? ____

How many are yellow? ____

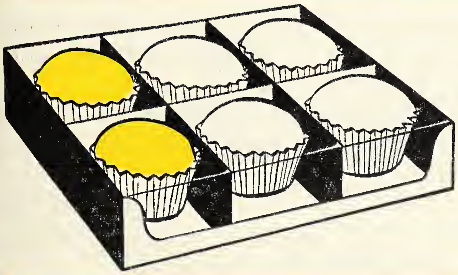
How many are white? ____



How many cakes are there? ____

How many are yellow? ____

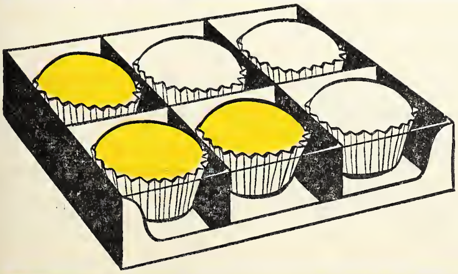
How many are white? ____



How many cakes are there? ____

How many are yellow? ____

How many are white? ____



How many cakes are there? ____

How many are yellow? ____

How many are white? ____

LEARNING MORE SUBTRACTION FACTS

Preparatory Activities

The exercises on page 39 present five new subtraction facts: 3 from 6 is 3, 5 from 6 is 1, 1 from 6 is 5, 4 from 6 is 2, and 2 from 6 is 4.

Dramatization. The new facts may be introduced through dramatization. In order to show the relationship between pairs of facts more clearly, a single situation may be used to introduce two related facts. For example, the children may dramatize these two stories:

Six boys were playing marbles. Five of the boys went home. Then how many boys were playing marbles?

Six boys were playing marbles. One of the boys went home. How many boys were playing marbles then?

It should be pointed out that the same three numbers, 6, 5, and 1, are used in the two facts, and that knowing that 1 from 6 is 5 helps us remember that 5 from 6 is 1.

Now these stories may be dramatized:

Six books were on the shelf. Mary took 4 of the books. How many were left?

Six books were on the shelf. Mary took 2 of the books. How many were left?

The relationship between the two facts should be explained. Then the following story may be dramatized:

Bob had 6 pencils. He gave 3 of them to Tom. How many pencils did Bob have left?

Using concrete objects. The facts may be developed next by each child at his desk, using small concrete objects. For example, the teacher may say:

Place 6 cards on your desk. Now take 5 cards away. How many cards are left on your desk?

Place 6 cards on your desk again. Take 1 card away. Now how many cards are on your desk?

Repeat the procedure for 4 from 6, 2 from 6, and 3 from 6.

Using Page 39

A number story should be told for each picture. The children write the number to complete the fact in horizontal form. Then they write the example in vertical form and subtract to find the answer. Since a model is provided for the first example only, make sure that the children write the larger number at the top in each of the other examples.

The following stories may be used:

Six boys were digging potatoes. Three of the boys went home. How many boys were digging potatoes then?

Six cows were under a tree. Five of the cows went away. Then how many cows were under the tree?

Six cows were under a tree. One of the cows went away. How many cows were under the tree then?

Six ponies were drinking water from a trough. Four of the ponies went away. How many ponies were drinking then?

Six ponies were drinking water from the trough. Two of the ponies went away. Then how many ponies were drinking?

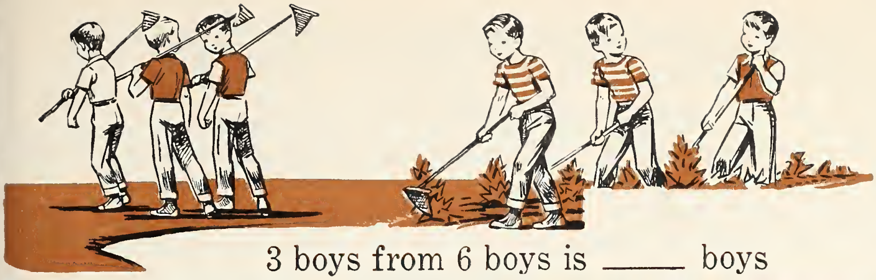
Follow-up Activities

Additional learning helps. Any children who had difficulty should be given more experiences with concrete objects.

The children may also make cards, such as those illustrated here, to use for study and practice later.

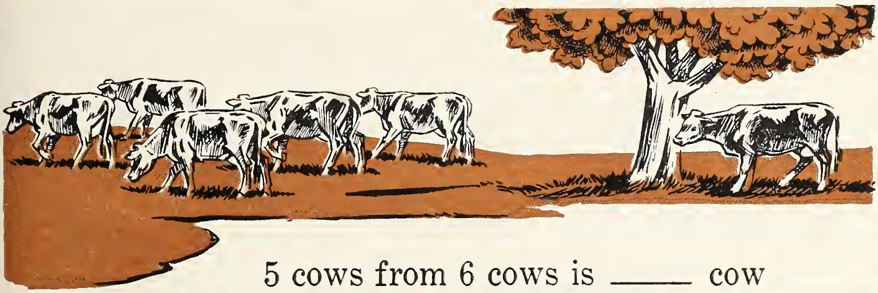
6 balls	6 balls	
5 balls	1 ball	
__ ball	__ balls	*(front)*

6 ○○○○○○	6 ○○○○○○	
5 balls	1 ball	
1 ball	5 balls	*(back)*



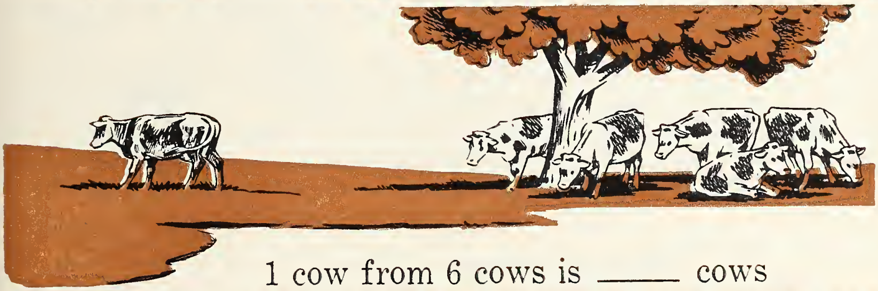
3 boys from 6 boys is ____ boys

6 boys
3 boys
____ boys



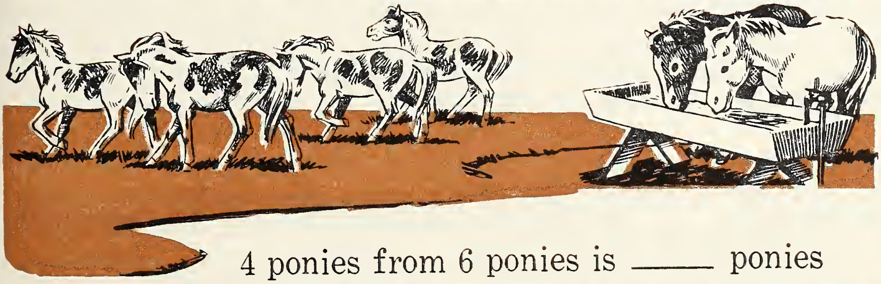
5 cows from 6 cows is ____ cow

cows
____ cows
____ cow



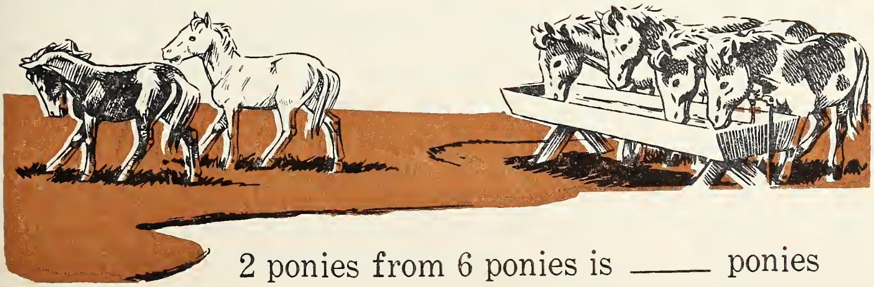
1 cow from 6 cows is ____ cows

cows
____ cow
____ cows



4 ponies from 6 ponies is ____ ponies

ponies
____ ponies
____ ponies



2 ponies from 6 ponies is ____ ponies

ponies
____ ponies
____ ponies

USING SUBTRACTION FACTS IN STORIES AND EXAMPLES

Preparatory Activities

The purpose of page 40 is to give practice on the 15 subtraction facts that have been introduced. Five of the facts are used in problems which the children are to solve without the aid of pictures.

No preparation should be necessary for the examples at the foot of the page.

Understanding number stories. Since the children are to solve number stories without the aid of pictures, the teacher may wish to prepare them for the exercise by having them read a few number stories, such as the following, from the blackboard and draw pictures to show that they understand the story when they read it silently.

James had 6 rabbits. He gave 4 of them to Bill. How many rabbits did James have left?

The children should illustrate the story by making 6 rabbits (or 6 X's), then mark out, or draw a line around, 4 of them to show that they are to be taken away, and finally write the answer, 2.

Care should be taken to use in the stories only those words which are in the children's reading vocabulary.

Using Page 40

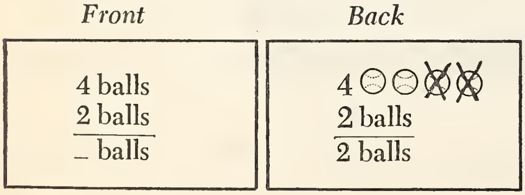
Have the children read the number stories silently and find the answers. If it seems desirable, let the children draw pictures of kittens to show how many there are to begin with, then mark out or draw rings around as many kittens as they are to take away. Lines, circles, or X's may be used if drawing kittens proves to be too difficult or too time-consuming.

Next have the children read the direction line above the examples and do what it tells them. Since this is not a new experience, they should be able to do the exercise independently.

Follow-up Activities

Additional learning helps. Since the exercises on page 40 lend themselves to diagnosis of learning difficulties, the teacher may wish to tabulate the children's responses to find which facts are not known by individual children.

Each child may be helped to make study and practice cards for the facts he did not know. On one side of the card, he may write the example without the answer. He may write the fact on the other side of the card with pictures to illustrate the minuend. The proper number of pictures may be marked out or a line may be drawn around them to show the number left.



If some of the children had difficulty with the number stories on page 40, the teacher may work with them individually or in a small group to find what caused the trouble. If it is reading and understanding the number stories, working out the stories sentence by sentence with the teacher's help and guidance may enable the children to work independently when number stories are met again.

Having the children read silently, and tell in their own words what the story said, may help them to interpret what they read. The teacher may say, for example, "Read to find two things the story tells." Then she may say, "Now read to find what it asks you." And finally, she may say, "Now tell me the whole number story."

Having the children draw pictures to illustrate the number stories is helpful also in developing their ability to visualize problem situations.

Six kittens were under a tree.
Two of the kittens went up the tree.
Then how many kittens were under the tree? ____

Two kittens were in a tree.
One of the kittens jumped out of the tree.
How many kittens were left in the tree? ____

Five kittens were playing.
Two of the kittens went into the house.
How many kittens were playing then? ____

Six kittens were in the house having milk.
Three of the kittens went out.
How many kittens were in the house then? ____

The six kittens were playing.
One of the kittens went to bed.
Then how many kittens were playing? ____

Take away, and tell how many are left.

3 pigs	4 wagons	6 dogs	5 cows	3 chickens
2 pigs	3 wagons	1 dog	4 cows	1 chicken
____pig	____wagon	____dogs	____cow	____chickens
6 hats	5 ponies	6 hens	4 boats	5 rabbits
4 hats	1 pony	3 hens	2 boats	3 rabbits
____hats	____ponies	____hens	____boats	____rabbits
4 cakes	6 ducks	2 dolls	5 balls	6 airplanes
1 cake	2 ducks	1 doll	2 balls	5 airplanes
____cakes	____ducks	____doll	____balls	____airplane

LEARNING POSITIONAL TERMS; MAKING SURE TEST

Preparatory Activities

Page 41 serves two purposes: (1) it introduces the positional terms *first, next,* and *last,* and (2) it presents the second "Making Sure" test, a test of the 15 subtraction facts that have been presented in the reteaching section.

Using concrete experiences. The terms *first, next,* and *last* can be introduced most meaningfully through realistic classroom activities such as the following:

Ask 5 children to stand in a row at the front of the room. Have them face left. Ask, "Which child is first in the row? Which is next? Which is last?" Then have the children face right. Repeat the questions and introduce the terms by writing them on the blackboard.

Help the children understand that in using these terms, the position in the series is important. For example, we must find which is first before we can find which is next or which is last.

Draw on the blackboard a series of trees, houses, or other objects. Indicate which is first in the series, and then have the children find the next and the last.

Using Page 41

Help the children identify the animals in the first exercise. Have them read the first sentence. Then have them answer the two questions by drawing a line around *Yes* or *No* to show the right answer.

In the second exercise the children are to draw a line from the word *first* to the first animal in the parade, and then draw another line from the word *last* to the last animal in the parade.

Tell the children to read the direction above the last exercise and write the answers to the examples. Since this is a test, they should work independently.

Follow-up Activities

Additional learning helps. If some of the children had difficulty with the terms *first, next,* and *last* in the exercise on page 41, they should be given more experiences of the kind suggested for preparatory activities. They may also carry out directions such as the following:

Put a book on the first, the next, and the last desk in each row.

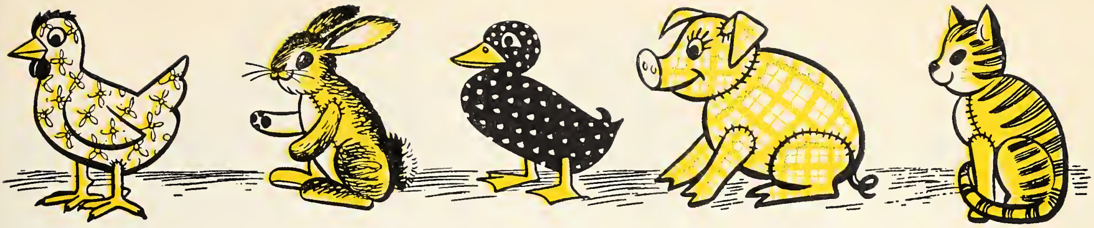
The first child in each row may pass the books. The next child in each row may pass the papers. The last child in each row may pass the rulers.

The teacher should make a careful diagnosis of the children's work on the "Making Sure" test and list the facts missed by each child. Then each child should be given a copy of the list of facts he missed so that he can study them.

A tabulation of the number of children who missed each subtraction fact will be useful also, since it will enable the teacher to identify the facts which caused the most difficulty as well as the facts which are known by everyone in the group.

Soon the addition and subtraction facts will be reviewed together and the relationship between the processes explained. The children who have not understood the subtraction facts or who have failed to learn them will be handicapped when they are presented with the related addition facts. Consequently, time should be taken now to provide those children with further concrete experiences and more opportunities to learn the facts.

Enrichment activities. The faster learners may be asked to work with the slower learners, each child being assigned to help another child learn the facts he does not know. This will not only save time for the teacher, but will also help to strengthen the faster learners' understanding of the subtraction facts.

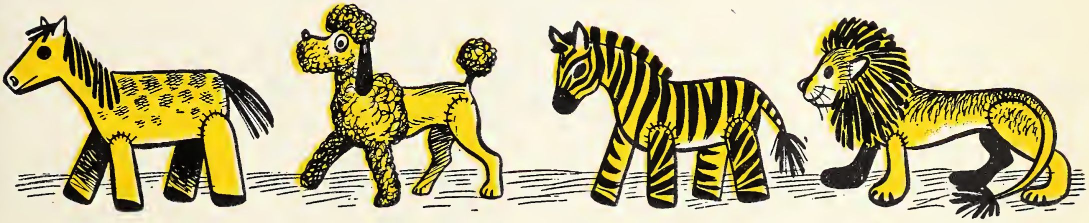


The hen is first.

Is the rabbit next? Yes No

Is the kitten last? Yes No

first
last



Take away, and tell how many are left.

3 boxes	6 hats	4 dogs	5 cows	4 airplanes
2 boxes	3 hats	1 dog	2 cows	3 airplanes
____box	____hats	____dogs	____cows	____airplane
5 balls	2 pigs	6 dolls	4 hens	5 chickens
4 balls	1 pig	2 dolls	2 hens	1 chicken
____ball	____pig	____dolls	____hens	____chickens
6 houses	5 cakes	6 beds	3 ducks	6 wagons
5 houses	3 cakes	1 bed	1 duck	4 wagons
____house	____cakes	____beds	____ducks	____wagons

TELLING TIME TO THE HOUR

Preparatory Activities

The exercises on page 42 will help the children learn to tell time to the hour. They will also learn the terms *clock*, *o'clock*, and *time*.

Using concrete experiences. The first experiences in telling time should be with an actual clock. The children should learn that the minute hand and the hour hand both move around the clockface at the same time, and that both hands are needed to show the time. The children must also learn that the hour hand moves from one number to the next while the minute hand moves all the way around the clockface.

If there is a large clock in the classroom, the children can be helped to associate events of the day with the time shown by the clock as they occur. For example, if school begins at 9 o'clock, the children may be shown that the hour hand points to 9 and the minute hand is at 12 when the time is 9 o'clock. The same procedure may be used to focus attention on the two hands of the clock when it is time for recess, time for lunch, and so on throughout the school day.

Children sometimes get the wrong impression about time when they manipulate the hands of a clock. For this reason, they should have abundant experience in observing a real clock before they are given "make-believe" clocks to manipulate. Calling attention to the even hours frequently will help them develop a sense of time and an understanding of the fact that the minute hand is always at 12 when the clock shows 10 o'clock, 12 o'clock, 3 o'clock, or any other hour.

A small clock, such as an alarm clock, is useful also in teaching children to tell time. The teacher may set the hands at 1 o'clock, for example, and ask the children to tell what time the clock shows. Then a picture of a clockface may be drawn on the blackboard with hands drawn to show 1 o'clock. The time, *1 o'clock*, may be written below the clockface.

Next, the hands of the clock may be turned to demonstrate that the long hand moves all the way around the clockface while the hour hand moves to the next number, 2. The children tell what time the clock shows now, and hands are drawn on a second clockface on the blackboard and *2 o'clock* written below it. Every hour from 1 o'clock to 12 o'clock may be demonstrated in this way.

Using Page 42

Discuss with the children the picture of the boy watching the television show. Help them discover that the time is 5 o'clock, then have them write in the blank the number that shows the time.

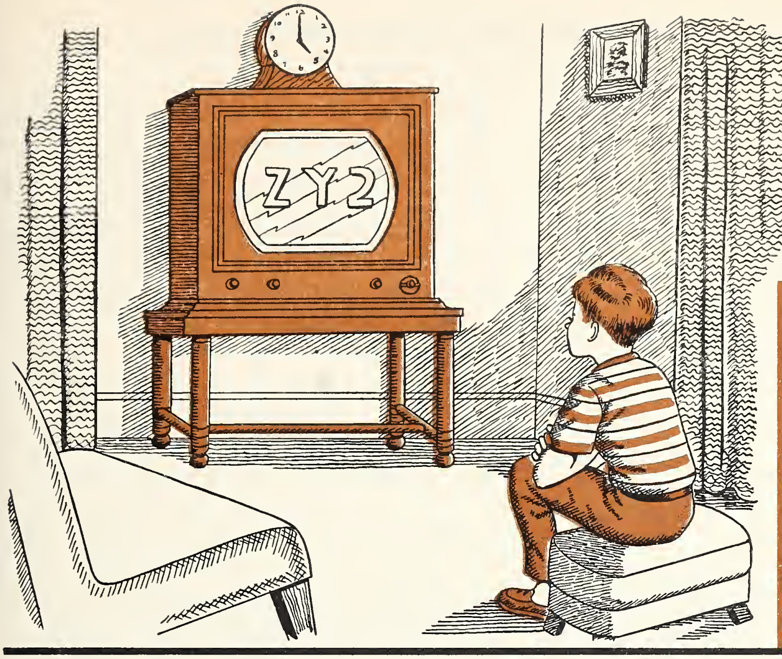
For the second exercise, help them read the direction, "Find the time. Write the time." Draw attention to the fact that on each of the four clocks the minute hand is at 12. Have the children write the time shown on each clock.

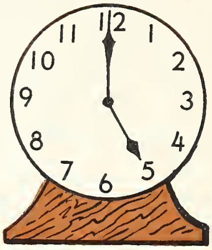
In the last exercise the children are to draw the hour hand on each clock to make it tell the time indicated below the clock.

Follow-up Activities

Additional learning helps. More experiences in telling time with an actual clock should be given to any children who had difficulty in telling time to the hour. Then they may be helped to make their own clockfaces with hands that can be set to show the time. Paper plates or large circles of cardboard with cardboard hands attached with round-head paper fasteners may be used. The children will need help in spacing the numbers accurately.

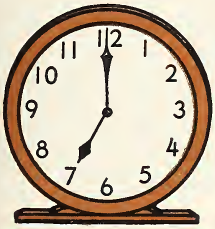
Enrichment activities. The faster learners will enjoy making and decorating clockfaces for their arithmetic scrapbooks.



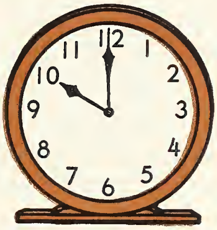


It is ____ o'clock.

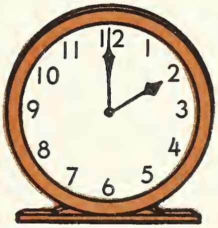
Find the time. Write the time.



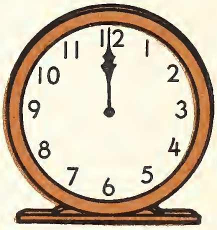
____ o'clock



____ o'clock



____ o'clock



____ o'clock

Make the clocks tell the time.

3 o'clock

6 o'clock

9 o'clock

UNDERSTANDING NUMBERS TO 100 AND MONEY TO ONE DOLLAR

The pupils are now ready for the last reteaching section, which is devoted to the reteaching of the number system to 100 and of money to one dollar.

Counting

It is quite likely that most children in the second grade can say the number words in sequence to one hundred. However, most of them will need a better understanding of what the numbers mean. The fact that our number system is a system of tens was introduced at the time the numbers to 20 were retaught, but counting experiences which help extend this understanding should be provided at this time. This activity should receive chief emphasis, although the teacher will wish to provide enough experience in counting by ones to make sure that all the children know the numbers in sequence.

Counting by tens serves two purposes. It helps the children develop a useful skill which will be used in many situations both in school and out. It also helps them understand our number system. When they discover the tens idea from an illustrated number chart or through the use of concrete materials, they gain greater understanding than would be possible in any other way.

Reading and Writing the Numbers to 100

Seeing the numbers on a chart arranged by decades and learning to read and write them in sequence is another means of helping the children attach meaning to the numbers. As they see the numbers in columns, as they read the numbers by decades, and as they write the numbers in columns by decades, they get an appreciation for and an understanding of the tens idea, and begin to develop an understanding of the concepts of place value.

Understanding the Meaning of Numbers

The tens idea can be carried forward at this point to help the children come to understand what any two-place number means. They can discover through the use of concrete objects, and later through the use of pictured materials, that a number such as 84, for example, means so many tens and ones: 8 tens and 4 ones in this case. Counting can contribute to this understanding. For example, the children may count objects and arrange them in groups of ten. Then they may count by tens to find how many there are. Next they may find how many tens and how many ones the number means by counting the groups of ten and the remaining objects. This activity can lead into the next step, which is to be able to tell how many tens and ones any abstract number means, and to learn that the figure on the left tells how many tens there are and the figure on the right tells how many ones there are in the number. This concept of place value can grow gradually as the children work with numbers, although the term *place value* will not be used until it is needed in the later grades. At that time the concept will be valuable from the standpoint of helping the children understand carrying in addition and borrowing in subtraction and giving them a better understanding of numbers.

Understanding Money to One Dollar

Children probably use arithmetic more in connection with buying and selling than in other experiences out of school. For this reason, they need an adequate treatment of money at the second-grade level. In *Making Sure of Arithmetic*, care has been taken to provide experiences with money to parallel the experiences with our system of numbers. The children have learned to read, write, and understand numbers to 100. Helping them to gain an understanding of the relationships among pennies, nickels, dimes, quarters, half dollars, and one dollar is the next learning step for the children. Thinking of a nickel as 5 cents and a dime as 10 cents, and counting by fives to 25 and by tens to 100 contribute to this learning.

LEARNING TO COUNT TO 100 BY ONES AND BY TENS

Preparatory Activities

The children are now ready for experiences in counting to 100 by ones and by tens. Through these experiences they will learn the number sequence if they have not learned it previously. They will extend their understanding of our number system as a system of tens through these counting experiences and attach richer meaning to the number words, which are probably already in their oral vocabulary although incompletely understood. Page 43 provides for the semiconcrete stage of these experiences in counting. Concrete classroom counting experiences should, of course, precede the semiconcrete experiences.

Using concrete materials. Counting can be learned most effectively through motivated experiences with realistic, concrete materials. The experiences should seem useful to the children, rather than forced or artificial.

The teacher probably knows which children, if any, do not know the number words in sequence to one hundred. She will wish to concentrate upon these children, calling upon them for a greater number of responses than are required of the other children.

The children may be asked to count materials that are needed for everyday classroom activities. For example, they may count the library books to see if there are enough for each child during a library story hour.

They may count the rulers, the scissors, or the boxes of crayons to see if all of them are in their proper places. They may count sheets of colored paper to see if there are enough to make the scrapbook they are planning.

Perhaps there has been a Junior Red Cross fund drive. The children may count the pennies to find how many were contributed. The pennies may be placed in stacks of ten to make the total amount easier to count. This type of experience leads logically into counting by tens and the concept of tens. Moreover, it has intrinsic interest that makes for permanent learning.

To continue this type of activity and to serve a useful purpose at the same time, the children may help make bundles of ten objects for later use. Counting sticks may be used for this purpose. Various children may count them out in groups of ten. Other children may check each group to make sure the counting was accurate. If counting sticks are not available, toothpicks, milk straws, or strips of cardboard may be used. Each bundle of ten may have a rubber band put around it to keep the ten together. The concept of ten objects together making 1 ten grows out of this experience and will be helpful later in understanding and interpreting two-place numbers.

The teacher may ask the children to help make an illustrated chart for the numbers to 100. The children may count small gummed seals such as stars, pumpkins, hearts, or dots to see if there are one hundred of one kind for the chart. The seals may be arranged in ten rows, with ten in each row. Someone may check by counting by tens to make sure there are one hundred of the seals and that they are arranged in rows of exactly ten seals each. Then the gummed seals may be pasted on the chart.

The children may be told that after they learn to write the numbers to 100, they may make a new game for the game table. They may get the materials ready at this time.

A cardboard box lid about 12″ by 12″, or a picture frame about that size from which the glass has been removed, will be needed. The children may be given one hundred 1-inch squares of cardboard, 1-inch counting cubes, or thoroughly washed milk bottle caps. The children may place them in the box lid or picture frame to see if they will fit in ten rows of ten each. Then they may count the objects by ones or by tens to see if there are one hundred for the game. Later the numbers 1 to 100 may be written on the objects. The children may see who can most quickly arrange them with the numbers in sequence.

Learning to Count to 100 by Ones and by Tens (continued)

Using Page 43

Discuss the picture at the top of the page. Then ask who can find how many cookies the children made. Some children will be able to count all of the cookies by ones. Others will need help. Have the counting done by the children who have shown during the preparatory activities that they need the experience. It may not be necessary to have individual children count all of the cookies. Perhaps one can count to 30, another from 31 to 60, and another from 61 to 100.

Through discussion, bring out the fact that there are ten cookies in each column. Then have several children take turns counting the cookies by tens. Care should be taken to see that the children think of counting by tens as a cumulative kind of counting. It is sometimes difficult for children to say "twenty" for column two when there are only ten cookies in the column. The step of difficulty for these children is to think of twenty as including the first and second tens and of thirty as taking in three columns.

Have several children take turns saying the numbers by tens to 100. Then call attention to the numbers below the columns. Explain that these are the numbers they said when they counted by tens. Have the children trace these numbers and then read them.

Then have them write the numbers 10, 20, etc., to 100 in the boxes below.

Follow-up Activities

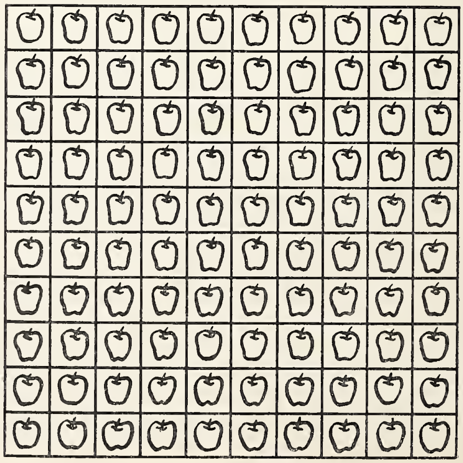
Additional learning helps. It is quite likely that none of the children had difficulty with counting by ones or tens unless there are very slow learners in the group. However, a few children may need more help in remembering the number sequence. If that is the case, it may help them to learn to count by tens first. Explain to them that after we count to twenty, we use the numbers one to nine with twenty, saying "twenty-*one,* twenty-*two,* twenty-*three,*" etc. Emphasizing the *one, two, three* may help them.

If the children continue to have difficulty with sequence, have them place small objects such as blocks in columns of 10, and count them. Then, if they fail to remember what decade comes next, they can count by tens to find out.

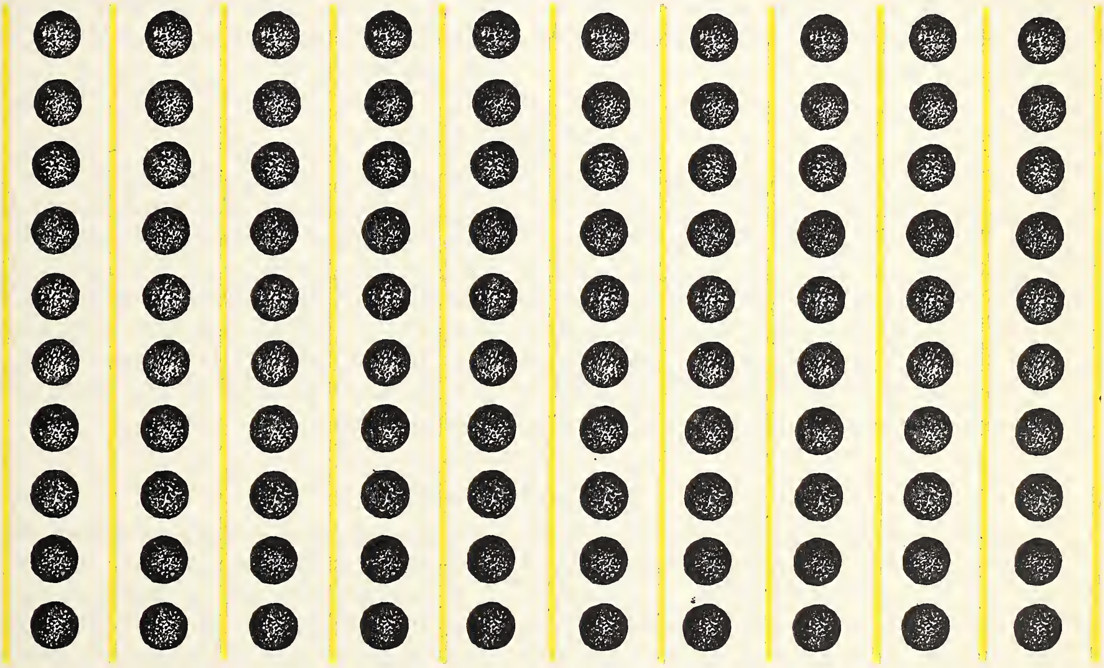
Rhythmic counting with kinesthetic responses may help also. Give the children 1-inch squared paper and have them make an X or a tally mark in each square in a column as they count slowly and rhythmically. Seeing the tens evolve as they count and mark often helps slow learners fix the sequence in mind.

It is likely that some child may need help with the concept of counting. He may need to be told that we count one; then we see another, and it makes two; then we see another, and it makes three, etc.

Enrichment activities. The faster learners may wish to make a number chart similar to that in the book for their folders or scrapbooks. One-inch squared paper may be used. The children may draw 100 apples, eggs, trees, or any other small, simple object in columns of 10.



Count, and tell how many.



10 20 30 40 50 60 70 80 90 100

Count by tens. Write the numbers you said.

10									100

LEARNING TO READ AND WRITE THE NUMBERS TO 100

Preparatory Activities

The pupils have used the number words *one* to *one hundred* in various counting experiences. They are now ready to read the numbers and to write them to 100. Page 44 provides material for this purpose.

Building a number chart. A valuable experience for the children is to help build a large number chart to be posted in the room for later use. A piece of manila tag or heavy wrapping paper about 18″ by 24″ may be used for this purpose.

In addition to helping the children learn to read the numbers, the chart can serve to carry forward the tens idea. In order to do this, the numbers on it must be arranged in decades: that is, the first column should include the numbers 1 to 10; the second, the numbers 11 to 20, and so on.

The children may watch while the teacher writes the numbers 1 to 10 at the left of the paper in a vertical column. Then she may ask what number comes after 10. A child may show where to write the *11* with help from the teacher if needed. After the *11* is written beside the *1*, the children may say the numbers to 20 while the teacher writes them in the second column. Then the teacher may ask what number comes after 20 and have a child show where it should be written. This procedure may be followed until the chart is completed to 100.

Following this activity, the teacher may give some practice in writing various numbers from 1 to 100 at the blackboard to make sure the children can write them neatly, legibly, and correctly.

Using Page 44

The number chart on page 44 is similar to the chart made as a preparatory activity. Have the children read the numbers as a group activity. Then have various pupils read the row beginning with 10, the row beginning with 5, the column beginning with 51, etc. Then have them find a specified number and read the number which comes before and the number which comes after it.

Continue these activities as long as necessary. Then call attention to the direction line below the chart. Have a child read it orally after all the children read it silently. Then tell them to begin with the *1* and trace the numbers to 10, then trace the *11* and write the numbers to 20 in that column. Continue the procedure until all of the numbers are written to 100.

Follow-up Activities

Additional learning helps. If some of the slower learners had difficulty in reading the numbers to 100, they should be given more help of the kind suggested for preparatory activities—perhaps working together to help build a number chart. It may help them also to read page numbers in response to such directions as these:

Turn the pages until you come to the one with the kittens under a tree. Tell us what page it is. Now find the page with the girls in the water. Tell us what page it is. What page comes just before it? What page comes just after it?

It may also be helpful to have children find specific pages in the book and tell what pictures they see on the pages.

If the difficulty was in writing the numbers in sequence, it may help to have each child make a chart of his own on one-half-inch squared paper. The teacher should give whatever help is needed to make the charts accurate and legible. When the charts are completed, the children may color very lightly the squares with numbers ending in zero. This will emphasize the numbers which are of particular help in writing numbers in sequence. The charts should be kept on the desks for reference during the next few days.

Read the numbers from 1 to 100.

1	11	21	31	41	51	61	71	81	91
2	12	22	32	42	52	62	72	82	92
3	13	23	33	43	53	63	73	83	93
4	14	24	34	44	54	64	74	84	94
5	15	25	35	45	55	65	75	85	95
6	16	26	36	46	56	66	76	86	96
7	17	27	37	47	57	67	77	87	97
8	18	28	38	48	58	68	78	88	98
9	19	29	39	49	59	69	79	89	99
10	20	30	40	50	60	70	80	90	100

Write the numbers from 1 to 100.

1	11	21	31	41	51	61	71	81	91
2									
3									
4									
5									
6									
7									
8									
9									
10	20								

UNDERSTANDING WHAT NUMBERS MEAN

Preparatory Activities

The children have developed some understanding of our number system as a system of tens. They will now extend this understanding to include the concept that two-place numbers are made up of so many tens and so many ones. Page 45 is designed to help them discover the number of tens and ones in various numbers.

Using concrete materials. Experiences with concrete materials should be used to prepare for the exercise in the pupil's book. The following are suggested:

Have each child place on his desk a rather large pile of counting objects, as blocks, pegs, buttons, or bottle caps. Ask the children to find how many they have on the desk by counting and arranging the objects in rows or stacks of ten each. Then have them count the things in stacks by tens and those left over by ones to find out how many there are. As each child reports his number of objects, write the number on the blackboard. Then ask him how many tens he has, and how many ones he has. Below the number, write the number of tens and the number of ones, as:

5 7
5 tens and 7 ones

After several groups have been counted and the number written as shown above, point out that the figure at the left tells how many tens there are and the figure at the right tells how many ones there are in the number.

Next, hold up 6 bundles of ten sticks and 3 single sticks. Ask how many tens there are and how many ones. Then ask how many there are altogether. Write, "63 means 6 tens and 3 ones."

Hold up 4 bundles of ten sticks. Ask how many tens there are and how many ones. Help the children see that there are 4 tens and no single sticks—no ones. Ask how many there are altogether. Write, "40 means 4 tens and 0 ones."

Do the same with 10 bundles of ten each, and write, "100 means 10 tens."

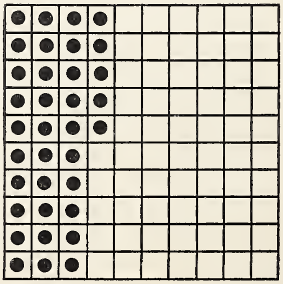
Using Page 45

Call attention to the fact that there are ten sticks in each bundle in the picture. Have the children count the single sticks in the first row. Then ask them how many tens and ones *16* means. Have them read the line and write *1* in the blank before *ten* and *6* in the blank before *ones*. Help them with the second row; then let them do the others at the top of the page with help as needed. Give help with the exercises at the foot of the page, emphasizing that "zero ones" means "no ones."

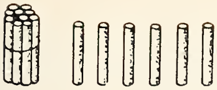
Follow-up Activities

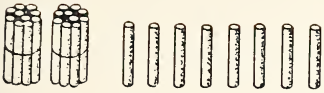
Additional learning helps. Give each child who needs help several bundles of ten counting sticks and 9 single sticks. Write on the blackboard a number such as 52. Have the children place bundles and single sticks on their desks to show what the number means. Then they may count to find how many tens and ones they used.

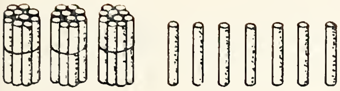
Enrichment activities. The faster learners may enjoy making "pictures" on squared paper, as illustrated in the next column, to show what numbers mean.

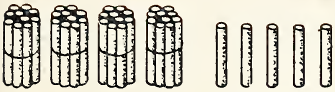


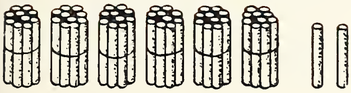
35 means 3 tens and 5 ones

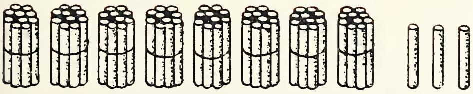

16 means ____ ten and ____ ones


28 means ____ tens and ____ ones

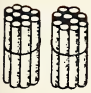

37 means ____ tens and ____ ones

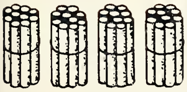

45 means ____ tens and ____ ones

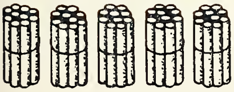

62 means ____ tens and ____ ones

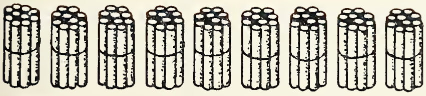

83 means ____ tens and ____ ones

10 means ____ ten and 0 ones


20 means ____ tens and 0 ones


40 means ____ tens and 0 ones


50 means ____ tens and ____ ones


90 means ____ tens and ____ ones

100 means 10 tens

LEARNING ABOUT THE DOLLAR

Preparatory Activities

The purpose of page 46 is to teach the children to recognize the one-dollar bill and to understand that it is as much money as 100 pennies or 10 dimes.

Using concrete materials. Actual money is best to use for the preparatory activities. If that seems inadvisable, toy money that is relatively realistic may be used.

Help the children think of things that cost a penny and others that cost a dime. Then review the concept that a dime is as much money as 10 pennies. For example, a piece of chewing gum costs 1 cent; we can buy 10 pieces for a dime.

Then help them to find how much money 100 pieces will cost. Making pictures in columns of ten each will help with the counting and lead to an understanding of the relationship between dimes and a dollar. For example, below each column of 10 pictures of sticks of gum, write *10 pennies.* The children count by tens to find that the 100 pieces cost 100 cents. Then they may be told that one dollar is as much money as 100 cents, or 100 pennies. Have them tell how many pieces of gum a one-dollar bill will buy.

Next, write below each column of pictures *1 dime.* Then have the children count the dimes to find how many will be needed to buy the 100 pieces of gum. Help them see that 10 dimes are as much money as 100 cents. One dollar is as much money as 100 cents, so 10 dimes are as much money as one dollar.

Using Page 46

Have the children count the pennies at the top of the page by tens and write in the blank the number that tells how much money they counted. Help them read the statement beside the picture of the one-dollar bill, and emphasize the generalization that one dollar is as much money as 100 pennies, or 100 cents.

Next, have the children count the dimes as tens to find how much money there is, and write the number in the blank. Emphasize the fact that 10 dimes are as much money as 100 cents, or 100 pennies.

In the next exercise, have the children read the sentence beside the picture. Then discuss the fact that one dollar is as much money as 10 dimes, 100 cents, or 100 pennies.

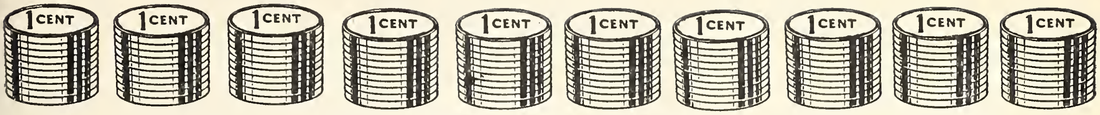
In the last exercise, explain to the children that they are to write in the blanks the numbers that tell how many cents are as much money as one dollar and how many dimes are as much money as one dollar.

Follow-up Activities

Additional learning helps. If some of the slower learners had difficulty with the exercises on page 46, it may be helpful to give them further realistic experiences. For example, have them think of something that costs 1 cent, as a balloon or a piece of candy. Help them find how many they can buy with a dime and with a dollar. They may use toy money and pretend that counting sticks or other small objects are the balloons. They place the objects and pennies side by side in rows of ten each, and count the pennies by tens to see that they have 100. Then they count the objects by tens to see that they could buy 100 balloons. Next, place a dime beside each row of ten objects and have the children count the dimes as tens to find how many cents the 10 dimes mean. Finally, substitute the dollar for the 10 dimes.

Enrichment activities. If a supply of toy money is not available, the faster learners may enjoy making some for the game table. They should make the money actual size by drawing around real coins and around a real one-dollar bill. They may write on each piece of money its value, as *1¢, 5¢, 10¢, One Dollar.*

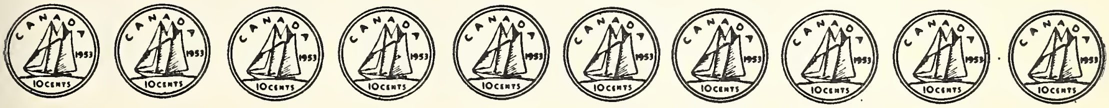
Count the pennies by tens.



How much money? ______ cents

One dollar is as much money as 100 cents.

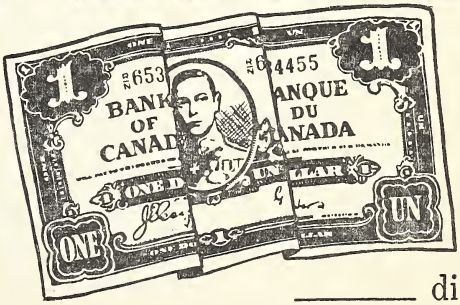
Count the dimes as tens.



How much money? ______ cents

One dollar is as much money as 10 dimes.

______ cents



______ dimes

LEARNING ABOUT THE QUARTER AND HALF DOLLAR

Preparatory Activities

The purpose of page 47 is to help the children recognize the coins *quarter* and *half dollar;* to learn that a quarter is as much money as 25 cents or 5 nickels; and to learn that a half dollar is as much money as 50 cents or 5 dimes.

Using concrete materials. Have the children name something which costs 1 cent, as a 1-cent stamp. Then use the object for the following activity:

Make a picture of five rows of five 1-cent stamps. Below them make a picture of five rows of five pennies each. Develop the idea that one stamp costs 1 cent, and five stamps cost 5 cents. Have the children count the stamps by fives to find that there are 25. Then have them find how much money the pennies are by counting them by fives. Draw a picture of a quarter beside the pennies. Tell the children that a quarter is as much money as 25 pennies, or 25 cents. Have them tell how many 1-cent stamps a quarter will buy.

Now make a picture of one nickel beside each row of stamps. Help the children to state the fact that a nickel will buy five 1-cent stamps. Then let them count the nickels as fives, and find how many 1-cent stamps 5 nickels will buy. Help them to see that 5 nickels are as much money as 25 cents, and that 5 nickels are as much money as a quarter.

Next, draw a picture of five rows of stamps with ten in each row. Follow the procedure outlined above to show the relationship among 50 pennies, 5 dimes, and a half dollar, having the children count the pennies by tens and the dimes as tens.

Using Page 47

Follow this procedure for the first three exercises. Have the children count the pennies by fives and write the number that tells how much money they counted. Next, have them count the nickels as fives and write the number that tells how much money they counted. Have them read, then discuss with them, the two statements in the third exercise beside the picture of the quarter.

Follow the same procedure for the next three exercises, having the children count the pennies by tens and the dimes as tens.

Finally, have the children write in the blanks at the bottom of the page the numbers that tell how many cents and how many nickels are as much money as a quarter; and how many cents and how many dimes are as much money as a half dollar.

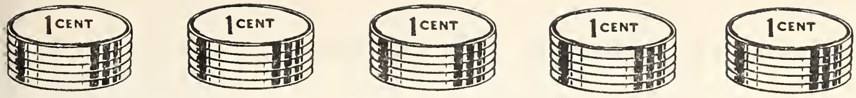
Follow-up Activities

Additional learning helps. If the slower learners had difficulty with page 47, another approach may be helpful. For example, the children may name something that costs 25 cents, as a toy car. Then they may be asked to place pennies in stacks of five on the table until they have enough to pay for the toy. Next, they place nickels on the table to show how many they need to pay for the 25-cent toy, counting each nickel as 5 cents as they place it on the table. They may then be asked how many cents make a quarter, and how many quarters are needed to buy a 25-cent toy.

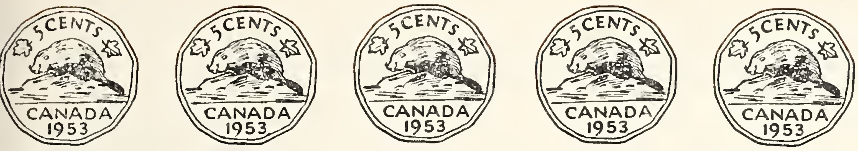
The same procedure may be used with a 50-cent toy, the children showing with stacks of ten pennies each the number of pennies needed to make 50 cents. Then dimes may be used, and finally a half dollar.

Enrichment activities. The faster learners may make cardboard or paper quarters and half dollars to add to the collection of play money.

These children will also enjoy making shaded pictures of coins for their scrapbooks. These are made by placing real coins under paper, and then rubbing over them lightly with a pencil or crayon.

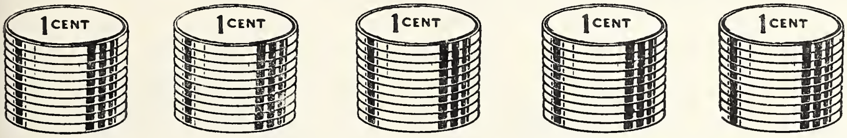


How much money? ______ cents

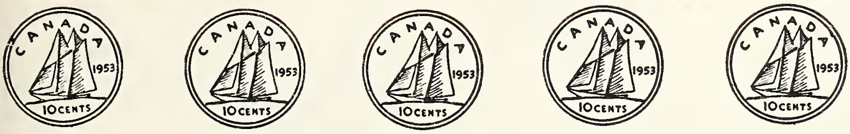


How much money? ______ cents

A quarter is as much money as 25 cents.
A quarter is as much money as 5 nickels.

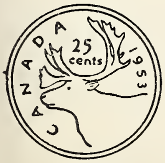


How much money? ______ cents



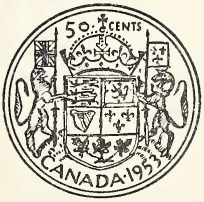
How much money? ______ cents

A half dollar is as much money as 50 cents.
A half dollar is as much money as 5 dimes.



______ cents

or ______ nickels



______ cents

or ______ dimes

THE DOLLAR, THE QUARTER, AND THE HALF DOLLAR

Preparatory Activities

Page 48 is planned to help the children understand that a half dollar is as much money as two quarters, and a dollar as much as two half dollars. It summarizes all of the things that have been learned about the half dollar and dollar.

Using concrete materials. The children may be helped to discover the relationships among quarters, half dollars, and dollars through the use of concrete materials and counting. This step is essential because it adds meaning to rather abstract ideas and enables the children to think about the concrete as they learn. The following procedure is suggested.

Tell the children that they may play that their counting objects are large gum drop candies that cost 1 cent each. Have them count out and place on their desks the number of gumdrops they could buy for a quarter. Review the fact that a quarter will buy as much as 25 cents. Now have the children count out and place on their desks as many more play gum drops as another quarter will buy. Let them count to find how many they can buy with two quarters. Then explain that two quarters are as much money as 50 cents.

Ask the children to tell how many cents are as much money as a half dollar. Then lead them to see that a half dollar will buy as many gumdrops as two quarters will buy, and that a half dollar is as much money as two quarters.

Next, let them discover how many pieces of candy they can buy for four quarters by counting out four groups of twenty-five each, and then counting them all. This should lead to the understanding that four quarters are as much money as 100 cents or a dollar.

Using the same plan, develop the concepts that two half dollars will buy 100 gumdrops; that two half dollars are as much money as 100 cents; and that two half dollars are as much money as a one-dollar bill.

Using Page 48

Have the children identify the coins in the pictures. Then have them read the sentences and write the numbers that belong in the blanks. Explain that when the numbers are written in the blanks at the bottom of the page, all of the things they have learned about a half dollar and a dollar will be stated.

Follow-up Activities

Additional learning helps. If some of the slower learners had difficulty, the teacher will wish to provide more practice with concrete objects, following the plan suggested for preparatory activities.

It may be helpful to have the children carry out the following activities, using 100 pennies, 4 quarters, 2 half dollars, and a one-dollar bill.

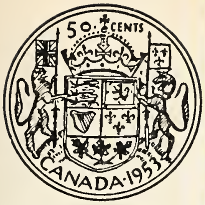
Have them place 50 pennies on the desk. Then ask them to count out pennies to show how many are as much money as a quarter; as two quarters.

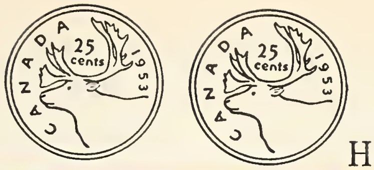
Next, have them count out as many pennies as they need to show how many are as much money as a half dollar. Lead them to see that two quarters are as much money as 50 pennies and that one half dollar is as much money as 50 pennies, so two quarters are as much money as a half dollar.

Repeat the procedure with pennies, half dollars, quarters, and a one-dollar bill.

Enrichment activities. The faster learners may enjoy playing bank with their toy money. They may have a "teller" who will give change to people who want it. For example, a child may say, "Please give me pennies for this quarter; dimes for this dollar; a half dollar for these dimes; dollars for these half dollars, etc."

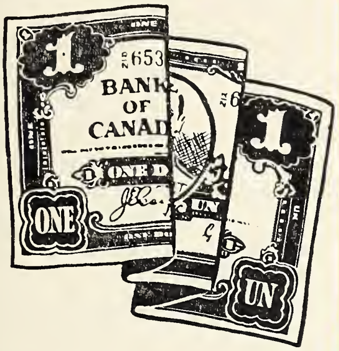
This activity is excellent preparation for later experiences in making change.

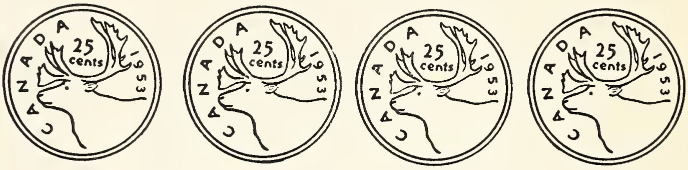




How many quarters? ____

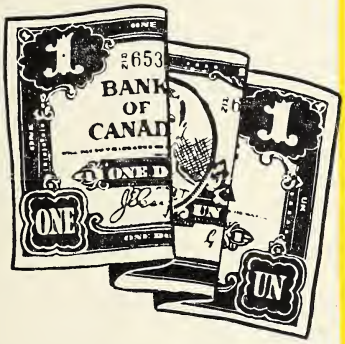
A half dollar is as much money as 2 quarters.

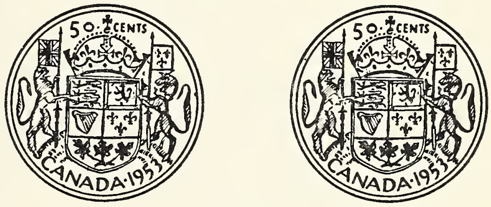




How many quarters? ____

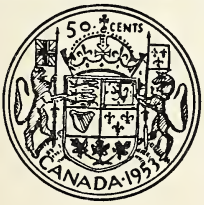
One dollar is as much money as 4 quarters.





How many half dollars? ____

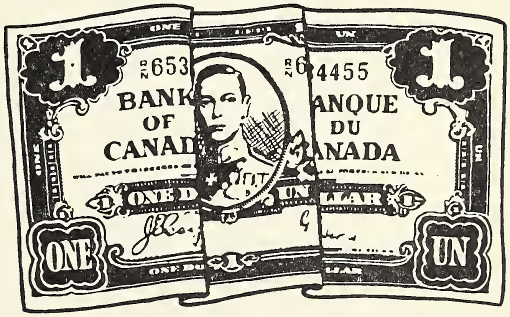
One dollar is as much money as 2 half dollars.



____ cents

or ____ dimes

or ____ quarters



____ cents, or ____ dimes,

or ____ quarters, or ____ half dollars

UNDERSTANDING THE RELATIONSHIP BETWEEN ADDITION AND SUBTRACTION

Now that the reteaching of the first-grade program is completed, the pupils are ready to begin the new work of the second grade. The first major step, after the introduction of linear measurement, will be to help them develop an understanding of the relationship between addition and subtraction.

In *Making Sure of Arithmetic,* the pupils are given an opportunity to become secure in their understanding of the addition process and of the subtraction process before the two are brought together. However, in the initial development of addition and of subtraction, a great deal is done in an incidental way to develop an understanding of the relationship between the two processes.

In this section of the pupil's book, the 15 addition facts and the 15 subtraction facts that were just retaught will be introduced in such a way as to bring out and show systematically the relationship between addition and subtraction. At first, pairs of related number stories will be dramatized. Then these facts will be used in related problems which are illustrated to emphasize the action that takes place when addition is called for, and the action that takes place when subtraction is called for.

A gradual transition will be made from the semiconcrete use of addition and subtraction to the abstract. The signs + and − will be introduced. They will be read *and* and *from,* since *plus* and *minus* have little meaning to children at this grade level.

As new facts are introduced from this time on, they will be introduced in learning units of related addition and subtraction facts, for example: $6 + 1 = 7$, $1 + 6 = 7$, $7 - 6 = 1$, $7 - 1 = 6$. This facilitates learning and emphasizes the relationship between the two processes. It is about as easy to learn the four related facts as it is to learn any one of the facts separately. Six such learning units will be introduced in this section of the pupil's book. Others will be introduced later in the program.

The addition and subtraction facts which were introduced in Grade One were retaught in the preceding section of this book according to the size of the sums and minuends. In this section of the book, the new facts will be introduced in the approximate order of difficulty of learning, as determined by various published studies.

The 15 addition facts and the 15 subtraction facts have all been used in number stories (problems), but the problems have never been mixed. Now problems requiring addition and problems requiring subtraction are to be included in the same exercise. This makes use of what the children have learned about the relationship between the processes and the meaning of each.

In the preceding section of their book, the pupils have had a planned program of readiness for reading problems. Now they are ready for help in problem solving which will enable them to decide when to add and when to subtract. Most of this help will be in the nature of strengthening the pupils' understanding of the relationship between the processes, developing number meanings, and aiding the pupils in visualizing problem situations.

In *Making Sure of Arithmetic,* the method of formal analysis and the plan of looking for cues in the problems are not used because they are likely to confuse rather than help the child. To try to help a child sort out and identify key words and specific items is likely to focus his attention upon details rather than the problem situation as a whole. In problem solving the child needs broad, general suggestions that will lead him to understand and interpret the whole problem situation. He needs to develop his own pattern of thinking rather than try to follow a pattern which may be imposed upon him.

Problem-solving skill depends very largely upon the ability to do a precise type of reading that is quite different from the type of reading children usually do. In problems, every detail is essential, but the relationships involved are the heart of the situation. The child needs experience and training in recognizing and understanding the relationships within problems. This understanding develops as the children grow in ability to visualize the story—to dramatize it mentally—and to read precisely enough to get the details in mind and keep them in mind long enough to react to the situation described. Merely sorting out and listing the details does not help. Something must happen in the child's mind *as he reads the problem,* to cause him to sense the relationships among the details of the problem situation.

Visualization plays an important part. Just as the child who has developed skill in reading interprets what he reads by supplying mental images from past experiences, so a child who has developed skill in problem solving visualizes the problem situation and interprets it according to his understanding of the arithmetical relationships involved. For this reason, the authors have suggested and will continue to suggest the dramatization of many, many oral problems. This is a most effective means of training children to visualize as they read problems.

Much has been done in *Making Sure of Arithmetic* to help the children feel secure in problem solving. They have been well prepared for the step in which they must decide what process to use in solving the problem. All of the facts have been introduced in realistic action problems. Many of these problems have been dramatized or illustrated with action pictures to help the pupils interpret the problems. The addition and subtraction processes have been made meaningful as they were introduced. The vocabulary of arithmetic and the concepts have been painstakingly developed. Numbers have been made meaningful. Relationships between the processes have been shown incidentally and will now be developed systematically. The introduction of mixed problems comes as a logical next step, as an extension of things already learned.

Several techniques will be suggested to focus attention upon interpretation and visualization. Among them are the following: having the children think what the number story tells; having them think what happens in the story and what the question asks about it; having them think how they would play the story; and having them show what happened.

In the reteaching section of the pupil's book, experiences with groups of 2 and 3 were provided. Then experiences with groups of 4 were provided. Then followed experiences with groups of 5, and experiences with groups of 6. In each case all of the possible arrangements of the groups were treated at one time. For example, all the arrangements of 6—5 and 1, 4 and 2, 3 and 3, 2 and 4, and 1 and 5—were developed together. This helped the children gain a better understanding of the numbers and also helped prepare them to visualize the addition and subtraction facts introduced later.

In this section of the pupil's book, experiences with groups of 7, 8, and 10 will be provided, but the treatment will be distributed. Before a learning unit of addition and subtraction facts is introduced, the children will be given opportunities to examine the groups from the standpoint of addition, and to examine them again from the standpoint of subtraction. This plan enables the children to visualize the groups and to develop a better understanding of the numbers in the groups *before* they are asked to use them in addition or subtraction facts.

The concept of subtracting to find how many or how much more one number or quantity is than another, or how much less one quantity is than another, also is developed. This concept of comparing is introduced through realistic situations and concrete materials which enable the children to compare the minuend and the subtrahend in the subtraction example illustrated. Then gradually the children are led to understand that we subtract to find the difference between the two groups.

Maintenance exercises are provided also for the understanding of the number system to 100 and money to one dollar.

LEARNING TO MEASURE BY THE INCH, FOOT, AND YARD

Preparatory Activities

The teacher will have no difficulty in motivating the exercise in measuring. Children are fascinated by such activities, and find many uses for their skill after it is developed. However, young children have to be taught how to measure and helped to develop the concepts of an inch, a foot, and a yard. Page 49 provides opportunities to measure by the inch and to draw to measure.

Using concrete experiences. Before the children attempt to do the exercises in their books, they should have concrete experiences in measuring. Experiences that grow out of classroom needs are best for this purpose.

For example, if large pictures are to be made, the children may use the foot ruler and the yardstick to measure the width of the paper. Then they may measure and cut pieces of paper 1 yard long, 2 yards long, etc., to use for large pictures or friezes.

The first step is to help them understand the difference between an inch, a foot, and a yard. Both yardsticks and rulers are necessary for this introductory experience. If they are not available, they can often be secured, free of charge, from hardware stores or paint and wallpaper stores.

The teacher will help the children locate the inch marks and the numbers on the foot ruler. They will find how long the foot ruler is and how long the yardstick is. Then they may discover by measuring that it takes 3 feet to make a yard.

They may use the yardstick and the ruler to measure the length of the reading table or the teacher's desk.

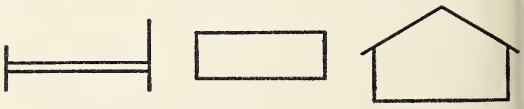
They may use a foot ruler to measure objects by the inch. Next, they should make something which requires them to measure —perhaps a card to use in an arithmetic game or a picture for a friend. They should learn how to hold the ruler and where to begin to measure. Then they should be asked to draw lines of specified lengths, as: 3 inches, 5 inches, 6 inches.

Using Page 49

Discuss with the children the picture of the 6-inch ruler at the top of the page. If they do not have other rulers, they may place a strip of cardboard along the edge of the pictured ruler and mark off the inches. The cardboard ruler can then be used for the exercises which follow.

Make sure that the children can read the questions and directions on the page. Explain that for each exercise they are to use their rulers to find the answer to the question, and then write the number of inches in the blank. Then they are to draw what the direction tells them.

Simple line drawings may be used. The important thing is that the length of each drawing should be the number of inches indicated in the direction. Models such as those below, drawn on the blackboard, will help the children with the exercises.

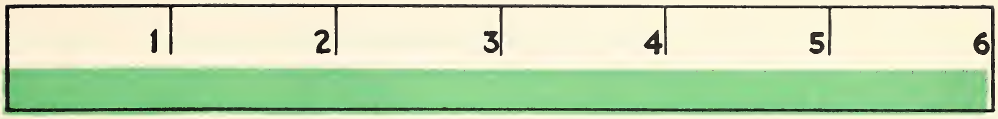


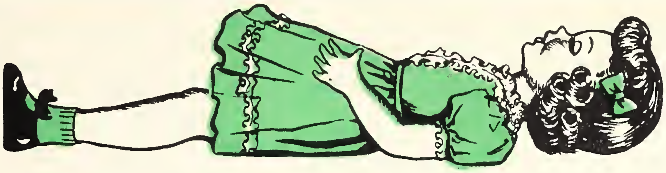
Follow-up Activities

Additional learning helps. If some of the children had difficulty, they may be given more experience in measuring after the teacher helps each one learn just how to use the ruler.

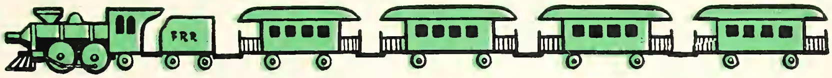
They may measure 9″ x 12″ art paper and cut it into strips 4 inches by 9 inches for use in making arithmetic practice cards. These cards will be needed when the next few pages are used.

Enrichment activities. The faster learners may find other things which they need to do or which interest them. Or they may help measure and cut paper for practice cards.

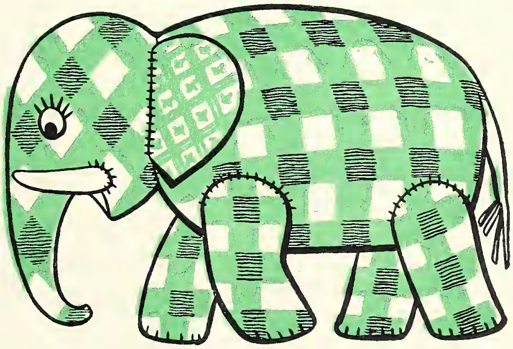




How long is the doll? _____ inches
Draw a bed for the doll.
Make the bed 5 inches long.



How long is the train? _____ inches
Draw a box around the train.
Make the box 6 inches long.



How long is the elephant? _____ inches
Draw a house for the elephant.
Make the house 4 inches long.

DISCOVERING THE RELATIONSHIP BETWEEN ADDITION AND SUBTRACTION

Preparatory Activities

The children are now ready to learn to use addition and subtraction as related processes. They may be helped to discover this relationship through the use of pairs of related number stories which are illustrated to show action. Page 50 provides two such pairs of number stories, and introduces the terms *add* and *subtract.*

Dramatization. Tell the children a number story such as the following and have them dramatize it:

Three clowns were dancing in a ring. Three more clowns came to dance. How many clowns were dancing then?

Write the example on the blackboard and have a child write the answer. Then tell this story and have it dramatized:

Six clowns were dancing in a ring. Three of the clowns went away. How many clowns were dancing then?

After the dramatization, write the example on the blackboard and have the children write the answer. Then explain that in the first story they added to find the answer, and in the second story they subtracted to find the answer.

Write the words *add* and *subtract* on the blackboard. Then tell the children that they may play two more stories and tell whether to add or subtract to find the answers. Tell one addition and one subtraction story and have the children dramatize them. After each dramatization, have the children write the example and put a line around the word *add* or *subtract* to tell how they found the answer. These stories may be used:

Two ponies were running around the circus ring. Four more ponies came into the ring. Then how many ponies were in the ring?

Six ponies were running around a circus ring. Four ponies ran out of the ring. Then how many ponies were in the ring?

Using concrete objects. Have the children get out their counting objects. Ask them to place 3 objects on their desks, then place 3 more beside them. Ask how many they have. Explain that they had 3 and added 3 more. So now they have 6.

Now have them put 3 of the 6 back in the box. Ask how many are on the desks now. Then explain that they had 6 and took 3 from them. So now they have 3 left.

Repeat the procedure with several known facts.

Using Page 50

Have the children study the picture at the top of the page and read the number story. Tell them to read the line that tells how to find the answer and then write the answer to the example. Through discussion, help the children to see why they added to find the answer: the picture shows 3 girls and 3 more coming; the story tells that there were 3 girls playing and that 3 more came. Emphasize the fact that we can tell how to find the answer when we think about the story and what the question in the story asks us.

Use the same procedure for the other number stories on the page. In the third and fourth exercises, the children should circle "Add" or "Subtract" each time in response to the last question.

Follow-up Activities

Additional learning helps. If some of the slower learners had difficulty, give them more number stories to dramatize, using other facts which they have had. Having them repeat a number story after they have heard it read or told may help. Then write a pair of related stories on the blackboard for them to read and answer.

Three girls were playing.
Three more girls came to play.
How many girls were playing then?

You add to find the answer.

3 girls
3 girls

____ girls

Six girls were playing.
Three of the girls went away.
How many girls were playing then?

You subtract to find the answer.

6 girls
3 girls

____ girls

Two boys were playing.
Four more boys came to play.
How many boys were playing then?

2 boys
4 boys

____ boys

Did you add or subtract? **Add** **Subtract**

Six boys were playing.
Four of the boys went away.
How many boys were playing then?

6 boys
4 boys

____ boys

Did you add or subtract? **Add** **Subtract**

USING ADDITION AND SUBTRACTION SIGNS

Preparatory Activities

The next learning step for the children is to learn to recognize and use the signs + and — to indicate addition and subtraction. They will read the signs *and* and *from*, since the words *plus* and *minus* have little meaning for them. The signs are introduced on page 51, and their use and meaning are explained.

Using concrete situations. The word *sign* should be introduced before the children attempt to use page 51. This can be done best in connection with familiar experiences. For example, the children probably know the term as it applies to "stop" and "go" signs and to signs along the highways. Perhaps the cent mark (¢) has been called "the cent sign."

After helping the children to recall the word orally, write it on the blackboard and tell them that they are to learn two new signs. Then introduce the plus and minus signs in connection with problems, as:

John had 4 pet rabbits. His father gave him another rabbit. Then how many rabbits did John have?

Ask a child to write the example on the blackboard and find the answer. Then ask, "Did you add or subtract to find the answer?"

Write the plus sign in the proper place by the example, and explain that we read the sign *and*. The fact is read, "4 rabbits and 1 rabbit are 5 rabbits."

$$\begin{array}{r} 4 \text{ rabbits} \\ +\,1 \text{ rabbit} \\ \hline 5 \text{ rabbits} \end{array}$$

Follow the same procedure in introducing the minus sign, telling the children that we read the sign *from*. In the fact shown here, we say, "1 rabbit from 5 rabbits is 4 rabbits."

$$\begin{array}{r} 5 \text{ rabbits} \\ -\,1 \text{ rabbit} \\ \hline 4 \text{ rabbits} \end{array}$$

Give the children opportunities to write both signs in examples, so that they will learn how and where to write them.

Using Page 51

In the first exercise, have the children study the picture and read the number story. Help them read the definition of the sign and the direction. Then have them add, and write the answer.

Make sure that the children can read the directions for the second exercise. Then have them add and write the answers to the examples. The children are to trace the signs in order to learn just where to place them in examples.

The third and fourth exercises are similar to the first two, and the same procedures should be used.

Follow-up Activities

Additional learning helps. If the teacher finds that some children need further help in learning the signs, it should be given at this time.

The children who need more help may be given activities such as those suggested for preparatory activities. Then they may be given examples in which to write the signs for addition and subtraction.

Enrichment activities. Those children who do not need help from the teacher may find other things to do. Or they may write and illustrate examples in which the plus and minus signs are used, as:

$$\begin{array}{r} 4 \text{ balls} \\ +2 \text{ balls} \\ \hline 6 \text{ balls} \end{array}$$

$$\begin{array}{r} 6 \text{ balls} \\ -3 \text{ balls} \\ \hline 3 \text{ balls} \end{array}$$

One frog sat in the sun.
One more frog came.
How many frogs were in the sun then?

The sign + means add.
Add, and write the answer.

1 frog
+ 1 frog
____ frogs

First, write the sign that means add.
Then add, and write the answer.

1 pig	3 balls	4 wagons	2 beds	3 hats
·:· 5 pigs	·:· 1 ball	·:· 2 wagons	·:· 3 beds	·:· 3 hats
____pigs	____balls	____wagons	____beds	____hats

Two frogs sat in the sun.
One of the frogs jumped into the water.
How many frogs were in the sun then?

The sign − means subtract.
Subtract, and write the answer.

2 frogs
− 1 frog
____ frog

First, write the sign that means subtract.
Then subtract, and write the answer.

6 rabbits	5 ducks	6 pigs	5 dogs	6 cakes
··· 3 rabbits	··· 2 ducks	··· 2 pigs	··· 4 dogs	··· 1 cake
____rabbits	____ducks	____pigs	____dog	____cakes

DECIDING WHEN TO ADD AND WHEN TO SUBTRACT

Preparatory Activities

All through the preceding pages the children have been building readiness for problem solving through many activities which have prepared them for reading and interpreting number stories. Now they should be able to take their first step in real problem solving—deciding which process to use in finding the answer—without difficulty. The first two stories on page 52 have action pictures to help with the visualization of the problem situations. The other number stories are not illustrated.

Dramatization. Dramatization should be used to prepare the children for this first attempt at problem solving. The teacher may state number stories and have the children dramatize the situation without completing the action. Each child should decide how to find the answer, and then write the example with the sign which shows whether he will add or subtract. The teacher should observe closely to see which children need help in deciding what to do to find the answer. The following stories, or similar stories, may be used for this activity:

Three girls were playing house. One of the girls went to play ball. Then how many girls were playing house?

Two girls were playing house. One more girl came to play. Then how many girls were playing house?

Four boys were playing ball. One more boy came to play. How many boys were playing then?

Five boys were playing ball. One boy went home. How many boys were playing ball then?

Three dogs were riding in a wagon. Two of the dogs jumped out. How many dogs were riding then?

One dog was riding in a wagon. Two more dogs climbed into the wagon. How many dogs were riding then?

If some of the children have difficulty, tell them to try to recall what happens in the story, and then decide what to do to find the answer. Call attention especially to the action sentence in each story—" One more boy came," "One boy went home," etc.

Using Page 52

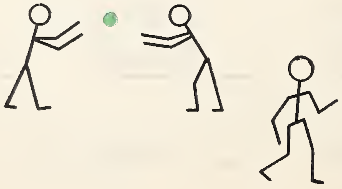
Call attention to the picture and the first number story. Help the children read the story and the directions below it. Then they may do as the directions say.

Follow the same procedure for the second story. Then let the children do the others alone. The teacher should supervise and give individual help where it is needed.

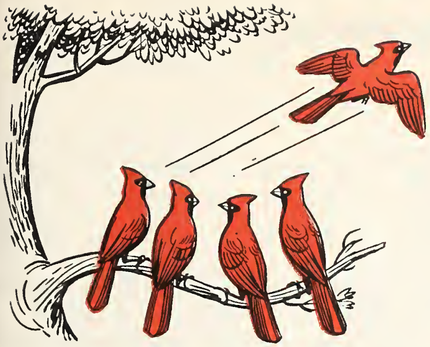
Follow-up Activities

Additional learning helps. If the slower learners had difficulty in deciding when to add and when to subtract, the teacher should talk with them and watch them as they work. If inability to read the problems is a factor, these children should be given help with the vocabulary before they attempt to solve the problems. If the difficulty is one of interpretation, dramatizing the stories and making pictures to illustrate them will help the children understand the problem situation. Squares, circles, or X's can represent the things in the stories. Lines may be drawn around the things to be taken away, and arrows used to show the things to be added.

Enrichment activities. The faster learners may draw, or cut from magazines, pictures for which they can write examples, as:



$$\begin{array}{r} 3 \text{ boys} \\ -1 \text{ boy} \\ \hline 2 \text{ boys} \end{array}$$

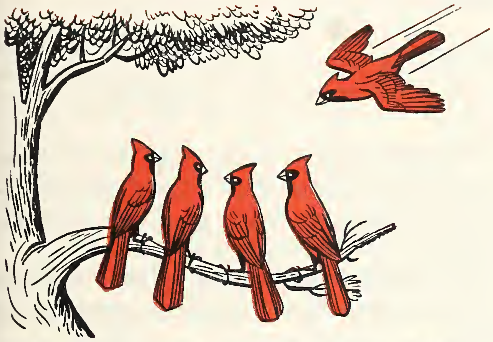


Five birds were in a tree.
One of the birds flew away.
Then how many birds were in the tree?

Write the sign
that tells what to do.

5 birds
1 bird

Write the answer. ____ birds



Four birds were in a tree.
One more bird came.
Then how many birds were in the tree?

Write the sign
that tells what to do.

4 birds
1 bird

Write the answer. ____ birds

Two elephants were in the elephant house.
One more elephant came.
How many elephants were in the house then?

2 elephants
1 elephant

Write the sign. Find the answer. ____ elephants

Three elephants were in the elephant house.
One of the elephants went out.
How many elephants were in the house then?

3 elephants
1 elephant

Write the sign. Find the answer. ____ elephants

One frog was in the water.
Two more frogs jumped in.
Then how many frogs were in the water?

1 frog
2 frogs

Write the sign. Find the answer. ____ frogs

Three frogs were in the water.
Two of the frogs came out.
Then how many frogs were in the water?

3 frogs
2 frogs

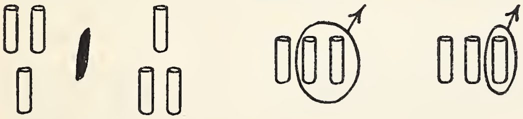
Write the sign. Find the answer. ____ frog

DISCOVERING GROUPS OF RELATED FACTS

Preparatory Activities

Page 53 provides material that will help the children discover how four addition and subtraction facts are related.

Using concrete objects. Have the children place on their desks 2 small objects. Then have them place 1 more object just below the 2 objects and tell how many there are in all. Have them leave these objects on the desks, and place near them 1 object and 2 more objects below it. Next, have them place 3 objects on the desk and "take 2 away" by moving them away from the original group. Then have them place 3 more objects on the desk and separate them by moving 1 object away. They will have on their desks these arrangements:



Write on the blackboard the "stories" which the objects tell:

$$\begin{array}{r} 2 \text{ pegs} \\ +1 \text{ peg} \\ \hline 3 \text{ pegs} \end{array} \qquad \begin{array}{r} 1 \text{ peg} \\ +2 \text{ pegs} \\ \hline 3 \text{ pegs} \end{array} \qquad \begin{array}{r} 3 \text{ pegs} \\ -2 \text{ pegs} \\ \hline 1 \text{ peg} \end{array} \qquad \begin{array}{r} 3 \text{ pegs} \\ -1 \text{ peg} \\ \hline 2 \text{ pegs} \end{array}$$

Help the children see that all of these facts use the same three numbers—2, 1, and 3.

Develop these groups of facts in the same way:

$$\begin{array}{rrrr|rrrr|rrrr} 3 & 1 & 4 & 4 & 4 & 1 & 5 & 5 & 3 & 2 & 5 & 5 \\ +1 & +3 & -3 & -1 & +1 & +4 & -4 & -1 & +2 & +3 & -3 & -2 \\ \hline 4 & 4 & 1 & 3 & 5 & 5 & 1 & 4 & 5 & 5 & 2 & 3 \end{array}$$

Dramatization. Next, help the children to see these relationships through dramatization of number stories in which the situation changes but the numbers do not, as:

Two boys were playing. One more boy came to play. How many boys were playing then?

One boy was playing. Two more boys came to play. How many boys were playing then?

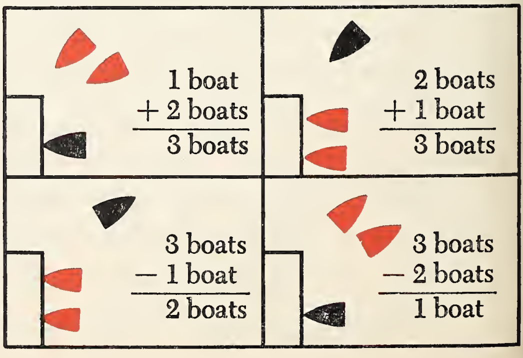
Using Page 53

Discuss with the children the four pictures in the first exercise. Point out that some of the boats are red and some are black and that the same 5 boats show what all four examples mean. In the next exercise all four examples are illustrated by one picture. Have the children read and follow the directions for each group of examples on the page. Point out that the examples in each row use the same three numbers.

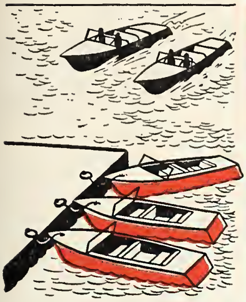
Follow-up Activities

Additional learning helps. Much of the children's success in learning the new facts to be presented during the remainder of the year will depend upon their understanding of the relationships developed on page 53. For this reason, any children who failed to understand the exercises should be given more experiences with concrete materials and with dramatization, as suggested for preparatory activities.

Enrichment activities. The faster learners may find it interesting to use color differentiation to show related groups of facts similar to those in the pupil's book. A piece of art paper may be folded into four equal parts, or the children may measure and draw lines to make four sections. Then each of the related facts may be illustrated this way:

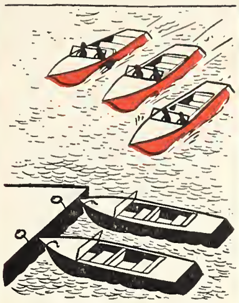


Add or subtract as the signs tell you.
Write the answers.



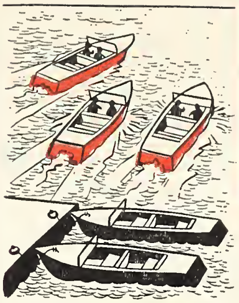
3 boats
+ 2 boats

____ boats



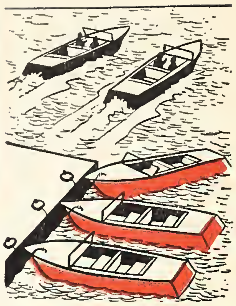
2 boats
+ 3 boats

____ boats



5 boats
− 3 boats

____ boats



5 boats
− 2 boats

____ boats

Add or subtract. Write the answers.

4 boats
+ 1 boat

____ boats

1 boat
+ 4 boats

____ boats

5 boats
− 4 boats

____ boat

5 boats
− 1 boat

____ boats

Add or subtract. Write the answers.

3 cows
+ 1 cow

____ cows

1 cow
+ 3 cows

____ cows

4 cows
− 3 cows

____ cow

4 cows
− 1 cow

____ cows

Add or subtract. Write the answers.

2 trees
+ 1 tree

____ trees

1 tree
+ 2 trees

____ trees

3 trees
− 2 trees

____ tree

3 trees
− 1 tree

____ trees

ADDING AND SUBTRACTING ABSTRACT NUMBERS

Preparatory Activities

The children have had abundant opportunity to work with examples that grew out of concrete and pictured experiences, and also with examples in which words were used to represent the concrete. The transition on page 54 to examples with abstract numbers should cause no difficulty.

Dramatization. The children should be prepared for the material on page 54 by dramatizing number stories, as suggested below.

Tell the children the following two stories and let them write the examples with words and numbers. Have them write the signs that show how to find the answers, and then write the answers.

Two cows were wading in a brook. Two more cows came to wade. How many cows were wading then?

Four cows were wading in a brook. Two of the cows went to rest under a tree. How many cows were wading then?

Next, ask the children if they can think what 2 and 2 are together without thinking of the things the numbers represent.

Write on the blackboard the examples with the words and without the words:

$$\begin{array}{r}2\text{ cows}\\+\ 2\text{ cows}\\\hline\text{cows}\end{array}\qquad\begin{array}{r}2\\+\ 2\\\hline\end{array}\qquad\begin{array}{r}4\text{ cows}\\-\ 2\text{ cows}\\\hline\text{cows}\end{array}\qquad\begin{array}{r}4\\-\ 2\\\hline\end{array}$$

Have the children write the answers, and then read the facts: "2 cows and 2 cows are 4 cows," "2 and 2 are 4," "2 cows from 4 cows is 2 cows," "2 from 4 is 2."

Repeat with other groups of known facts that are related until the children have demonstrated that they understand the abstract examples.

Using Page 54

In the first two exercises the children are to study the pictures, read the number stories, and then add or subtract to find the answers to the examples.

Make sure that the children can read the direction lines in the last two exercises. Then have them write the answers to the examples.

The work on this page should be supervised carefully, and help given to individual children if they seem to have difficulty in working with the examples.

Follow-up Activities

Additional learning helps. If some children had difficulty with page 54, they should be given more experiences of the kind suggested for preparatory activities.

Since these slower learners may need help all through the year, it will be an excellent plan to have them make a study card for each unit of related facts.

Front

$$\begin{array}{r}4\\+2\\\hline\end{array}\quad\begin{array}{r}2\\+4\\\hline\end{array}\quad\begin{array}{r}6\\-4\\\hline\end{array}\quad\begin{array}{r}6\\-2\\\hline\end{array}$$

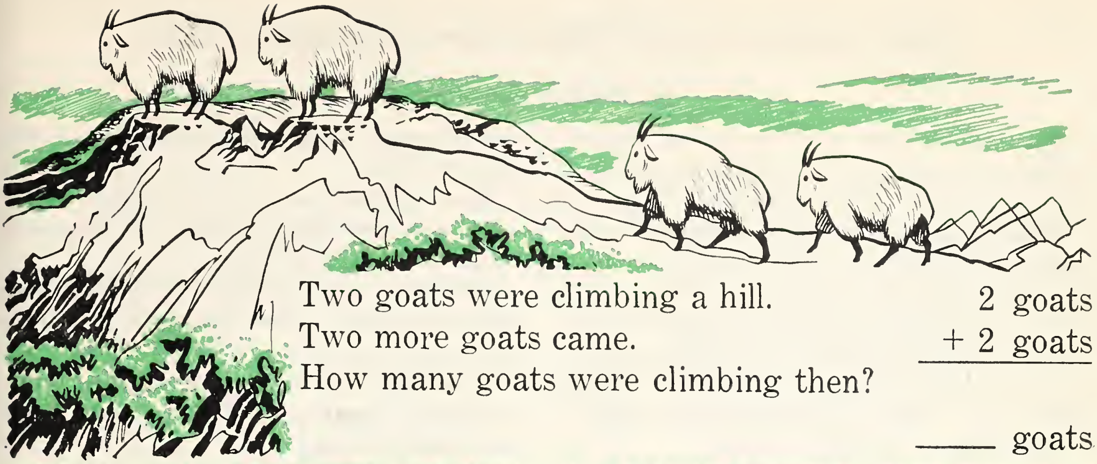
Back

$$\begin{array}{r}4\\+2\\\hline 6\end{array}\quad\begin{array}{r}2\\+4\\\hline 6\end{array}\quad\begin{array}{r}6\\-4\\\hline 2\end{array}\quad\begin{array}{r}6\\-2\\\hline 4\end{array}$$

As the child has trouble with an example, he may examine the back of the card to help him find the answer.

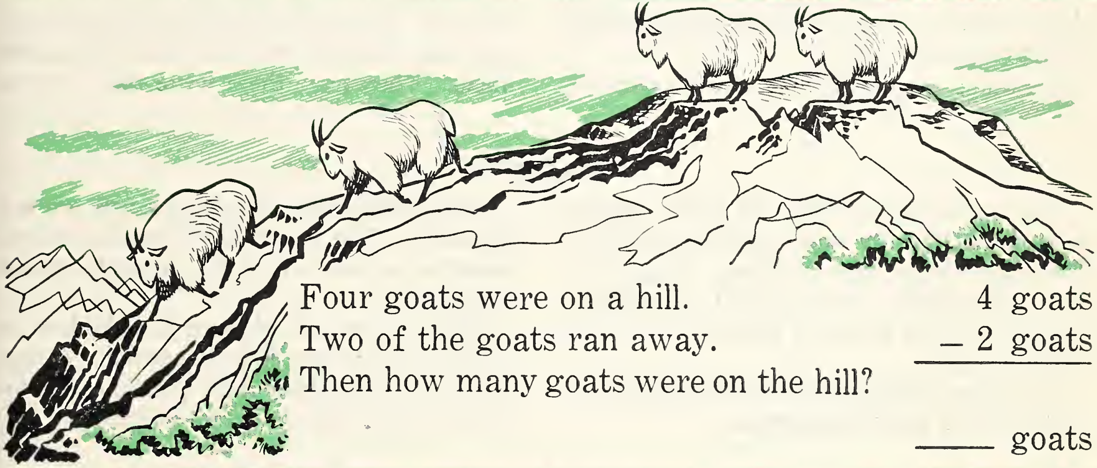
Enrichment activities. The faster learners may make practice cards, like the card labelled "Front" in the left-hand column, for the game table. Or they may help the slower learners to make their cards.

The cards may be used to play this game: A child holds the cards and says, "I am thinking of addition and subtraction facts that use the numbers 2, 4, and 6." Another child tries to give the four facts that are on the card so he will get the card. His goal is to recall the 30 facts he has learned and thus win all nine cards.



Two goats were climbing a hill.
Two more goats came.
How many goats were climbing then?

$$\begin{array}{r} 2 \text{ goats} \\ +\,2 \text{ goats} \\ \hline \\ \underline{\quad\quad} \text{ goats} \end{array}$$



Four goats were on a hill.
Two of the goats ran away.
Then how many goats were on the hill?

$$\begin{array}{r} 4 \text{ goats} \\ -\,2 \text{ goats} \\ \hline \\ \underline{\quad\quad} \text{ goats} \end{array}$$

Add or subtract as the signs tell you.
Write the answers.

$$\begin{array}{r} 2 \text{ goats} \\ +\,2 \text{ goats} \\ \hline \\ \underline{\quad\quad} \text{goats} \end{array} \qquad \begin{array}{r} 4 \text{ goats} \\ -\,2 \text{ goats} \\ \hline \\ \underline{\quad\quad} \text{goats} \end{array} \qquad \begin{array}{r} 2 \\ +\,2 \\ \hline \\ \underline{\quad\quad} \end{array} \qquad \begin{array}{r} 4 \\ -\,2 \\ \hline \\ \underline{\quad\quad} \end{array}$$

Add or subtract. Write the answers.

$$\begin{array}{r} 4 \\ +\,2 \\ \hline \end{array} \quad \begin{array}{r} 2 \\ +\,4 \\ \hline \end{array} \quad \begin{array}{r} 6 \\ -\,4 \\ \hline \end{array} \quad \begin{array}{r} 6 \\ -\,2 \\ \hline \end{array} \qquad \begin{array}{r} 5 \\ +\,1 \\ \hline \end{array} \quad \begin{array}{r} 1 \\ +\,5 \\ \hline \end{array} \quad \begin{array}{r} 6 \\ -\,5 \\ \hline \end{array} \quad \begin{array}{r} 6 \\ -\,1 \\ \hline \end{array}$$

USING ADDITION AND SUBTRACTION IN NUMBER STORIES

Preparatory Activities

Page 55 provides a set of stories which will give the children an opportunity to decide whether to add or subtract.

Reading number stories. Two problems confront the children in the exercise on page 55. One is to read the stories and keep the details in mind long enough to react to them. The other is to visualize the situations so that they can decide what process to use. They should have help with these two problems before they use page 55.

The teacher may write on the blackboard these number stories, or other number stories that are appropriate:

Six trains were at the station. Five trains pulled away. How many trains were at the station then?

One airplane was on the ground. Four more airplanes came. How many airplanes were on the ground then?

Four cars were in the parking lot. Two more cars came. Then how many cars were in the parking lot?

Five boats were sailing on the lake. Four boats came to the shore. How many boats were sailing then?

Help the children with the words that may be new. Then have them read the stories and make pictures to show what the stories mean. Then have them write the answers.

Using Page 55

Anticipate the words in the stories which may cause difficulty, and introduce them before the children begin reading. Suggest to the children that, as they read each story, they think what the story tells and what the question asks.

Have the children read the stories silently, and find and write the answers.

Notice that labels for the answers are not provided. The questions all make evident what the answers are to be, so labels are not necessary.

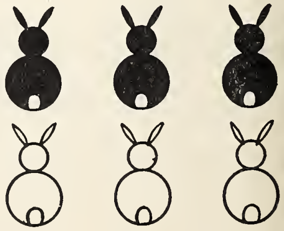
The teacher will observe the children at work to find where help is needed. A suggestion or a supplementary question to an individual child may help him succeed.

Follow-up Activities

Additional learning helps. The teacher may have the children who need help dramatize the stories in the book. Then these children may be given a set of similar stories to read silently. The teacher should work with them closely to encourage visualization and retention of details. Having the children tell the stories in their own words after they read them may help. Such questions as "How many kittens were there? What happened to some of them? What question do you need to answer?" may help guide the rereading of the story so that the children will follow it and retain the details.

Learning to solve problems is a complex process which depends upon maturity of reading, thinking, and visualizing. The teacher will need to repeat many times activities that will help the slower learners grow in these ways.

Enrichment activities. The faster learners may be interested in writing and illustrating number stories similar to those in their book, as:

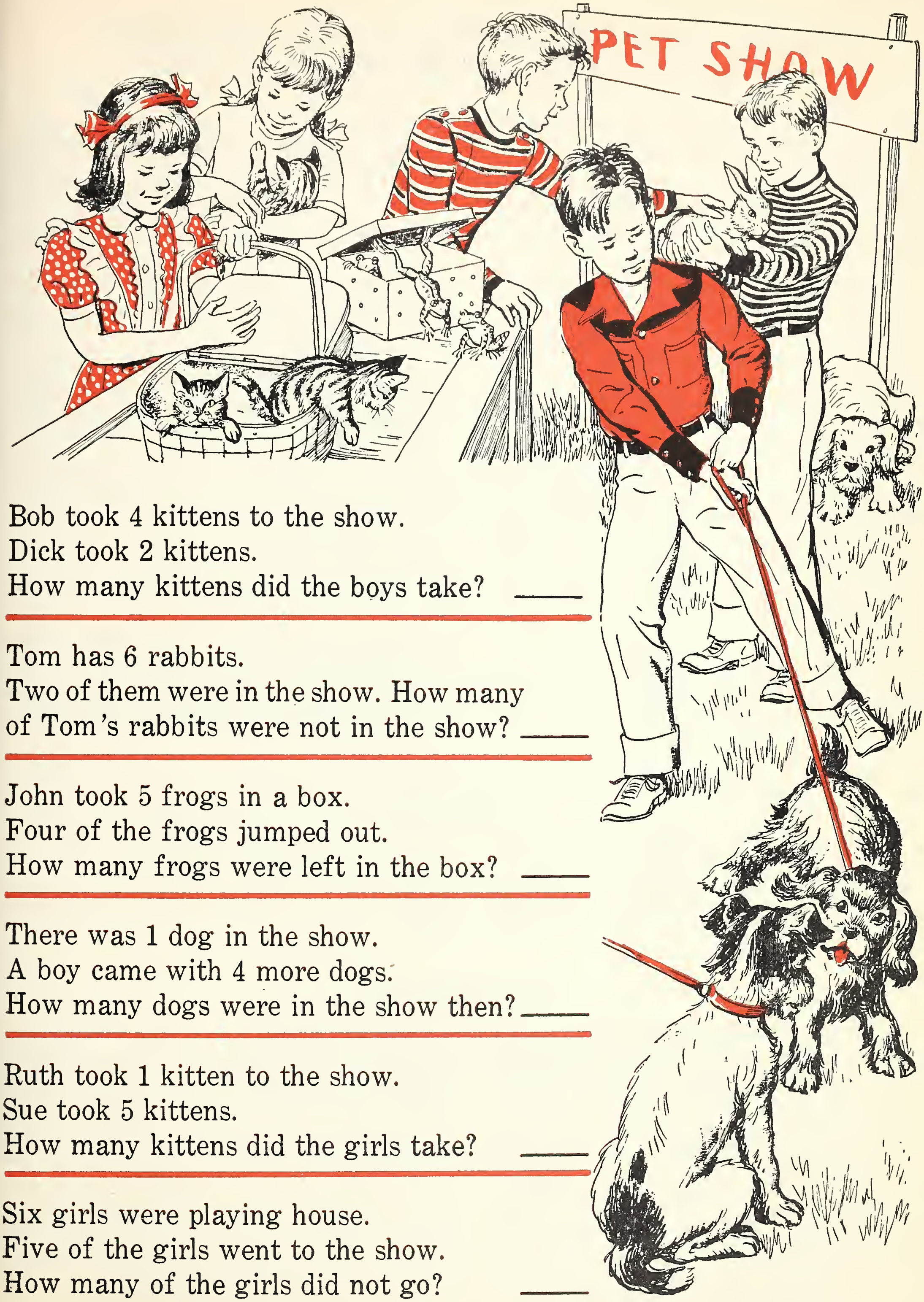


Bill has 6 rabbits.

Three of them are black.

How many are not black?

$$\begin{array}{r}6\\ \underline{-3}\end{array}$$



Bob took 4 kittens to the show.
Dick took 2 kittens.
How many kittens did the boys take? ____

Tom has 6 rabbits.
Two of them were in the show. How many
of Tom's rabbits were not in the show? ____

John took 5 frogs in a box.
Four of the frogs jumped out.
How many frogs were left in the box? ____

There was 1 dog in the show.
A boy came with 4 more dogs.
How many dogs were in the show then? ____

Ruth took 1 kitten to the show.
Sue took 5 kittens.
How many kittens did the girls take? ____

Six girls were playing house.
Five of the girls went to the show.
How many of the girls did not go? ____

LEARNING ABOUT PINTS, QUARTS, HALF PINTS, AND GLASSES; MAKING SURE OF ADDITION AND SUBTRACTION FACTS

Preparatory Activities

Among the measures that second-grade children need to understand are the pint, the quart, the half pint, and the glass. The first part of page 56 provides an exercise in the use of these measures.

The third in the series of "Making Sure" tests occurs on this page also. It tests the 30 addition and subtraction facts in the abstract form and will diagnose difficulties as a basis for further study of the facts.

Using realistic experiences. In the development of concepts about measures the children must have realistic experiences. The pupil's book can at best provide only pictures of the measures. Children need to see and use the measures if they are really to understand them. The following activities, or similar ones, should be carried out to supply these realistic experiences.

Have the children bring in empty milk cartons or bottles. Call attention to the labels on them, and discuss their comparative sizes. Then let the children discover by measuring water that a quart of water will fill 2 pint containers and a pint of water will fill 2 half-pint containers or 2 glasses. Since glasses differ in size, the children will need to experiment to find the size that holds one-half pint. (The teacher should note that the household measuring cup is based on the wine gallon measure used in the United States. 2½ of these measuring cups are equal to one Imperial pint. Do not confuse the children by introducing the measuring cup at this stage.)

Children sometimes confuse the measure (the container) with the concept. They must be helped to understand that it is milk, water, orange juice, etc., that we measure. When this is clearly understood, a chart may be made and illustrated with pictures of glasses or bottles of milk, orange juice, etc., cut from magazines. The chart should show that 1 quart is as much as 2 pints; 1 pint is as much as 2 half pints; 1 pint is as much as 2 glasses; 1 half pint is as much as 1 glass.

Using Page 56

Have the children identify the measures in the pictures. Then let them demonstrate with actual measures and water the thing that is happening in each picture. They may fill the blanks when they have discovered what numbers go in the blanks.

Have the children read the directions above the examples, then write the answers.

Follow-up Activities

Additional learning helps. If some of the children need more help with measures, have them use real measures to discover the answers to such questions as these:

If you wanted to buy a quart of tomato juice, how many pint bottles of juice would you need to buy? If you wanted a pint of cream, how many half pints would you buy to have the pint? If you needed two glasses of milk, how many pint bottles of milk would you buy? If you wanted one glass of milk, what size bottle of milk would you buy?

The teacher will wish to study each pupil's answers to the "Making Sure" test to find and make a record of the facts he has failed to learn. Each child should be given a list of the facts he needs to study, and then helped to make study cards for these facts if he has not done so before. Concrete materials may be used again to help him discover the facts. Having studied them, he should practise writing or saying the facts he found difficult. It may help to have the children draw pictures to illustrate the more difficult facts.

1 half pint

1 glass

1 half pint of milk will fill ____ glass

2 half pints of milk will fill ____ glasses

1 pint

2 glasses

1 pint of milk will fill ____ glasses

1 pint is as much as ____ glasses

1 pint is as much as ____ half pints

1 quart

2 pints

1 quart of milk will fill ____ pint bottles

1 quart is as much as ____ pints

Add or subtract as the signs tell you.

2	1	5	5	4	1	6	2	6	4
− 1	+ 3	− 2	+ 1	− 2	+ 2	− 4	+ 3	− 5	+ 1
2	6	1	3	1	4	4	5	3	6
+ 2	− 2	+ 5	− 2	+ 1	− 1	+ 2	− 4	+ 1	− 3
5	3	5	2	4	3	6	1	3	2
− 1	+ 3	− 3	+ 1	− 3	+ 2	− 1	+ 4	− 1	+ 4

WORKING WITH GROUPS OF FOUR, FOUR, AND EIGHT

Preparatory Activities

As explained earlier, the children are to be given an opportunity, before new addition and subtraction facts are introduced, to study the groups which they will be combining and separating. These experiences extend the children's understanding of numbers and also serve as preparatory experiences for learning the facts. On page 57 they will first see two groups of 4 each and think of them as making a larger group of 8. Then they will see a group of 8, which corresponds to the minuend in subtraction, and find within the group two smaller groups of 4.

Using concrete objects. The children should work with actual objects before they use their books. The following, or similar, experiences may be provided:

Arrange 4 boys and 4 girls in the front of the room. Ask the children to tell how many girls there are, how many boys there are, and how many children there are.

Have each child place on his desk 4 small objects such as blocks. Next, have him place 4 more objects on his desk. Then have him find out how many there are in all.

Arrange 8 children at the front of the room. Have 4 of them seated and 4 standing. Ask:

How many children are there? How many are sitting? How many are standing?

Then arrange 4 story books and 4 readers on a table. Ask:

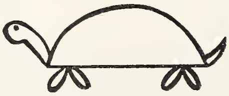
How many books are there? How many are story books? How many are readers?

Now have the children place on their desks 8 small objects. Have them push 4 of the objects to one side. Ask how many objects are in each of the small groups.

Using Page 57

Let the children discuss the picture at the top of the page. Then have them read the questions and write the answers.

In the next exercise they are to draw turtles as directed, and write the number which tells how many they drew in all. If some children find it difficult to draw turtles, they may draw rings and pretend they are turtles. However, simple line drawings, such as these, may be drawn on the blackboard for the children to use as models:

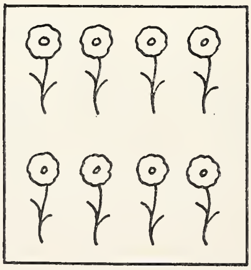


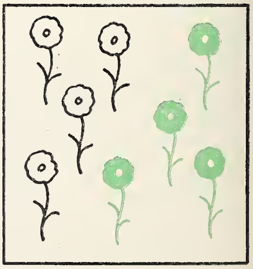
Then have them study the last picture and write the answers to the three questions.

Follow-up Activities

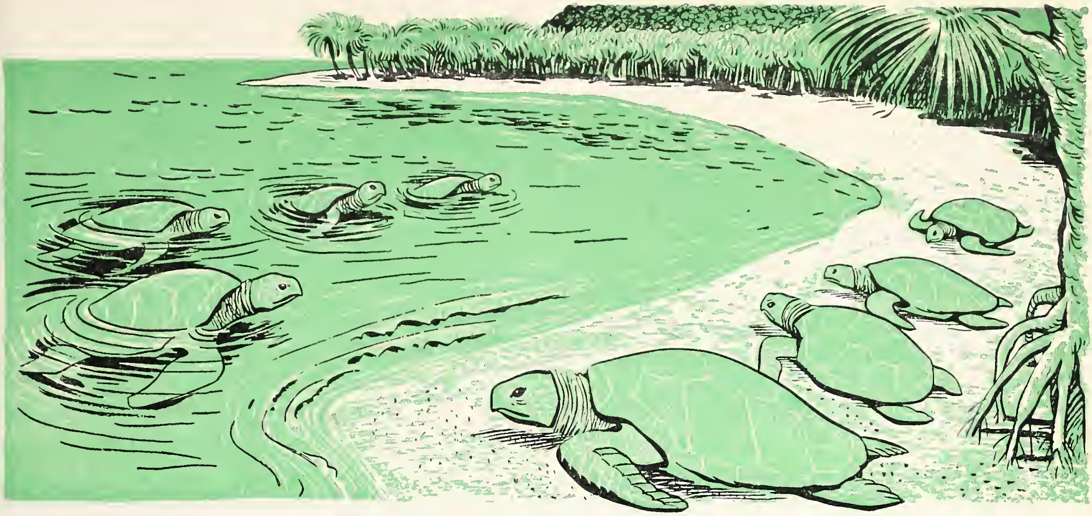
Additional learning helps. It is unlikely that any child had difficulty with the group of 8, since many similar exercises have been presented earlier. However, if some children did have difficulty, they should be given additional experiences with concrete objects, such as those suggested under preparatory activities. Then they may make pictures on a 6″ x 9″ or a 9″ x 12″ piece of art paper. This may be the first in a set of cards on grouping, to which they will add as other groups are studied.

The following is one plan for making the cards:





Enrichment activities. The children who do not need help at this time may choose other things they need to do in another subject area. Or they may play some of the games on the arithmetic game table.



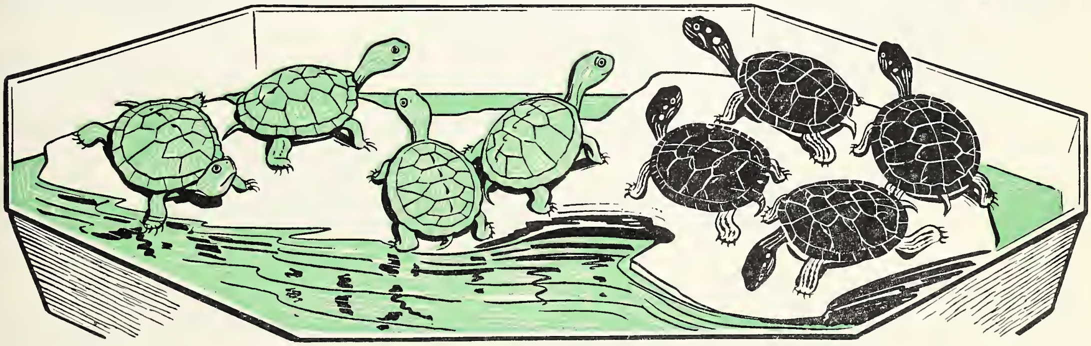
How many turtles are in the water? ____

How many are out of the water? ____

How many turtles are there? ____

Draw 4 turtles.

Then draw 4 more turtles. ____



How many turtles are there? ____

How many of the turtles are green? ____

How many are black? ____

LEARNING TWO NEW FACTS

Preparatory Activities

The first of the new addition and subtraction facts to be introduced in Grade Two appear on this page. They are: $4 + 4 = 8$, $8 - 4 = 4$. The facts are introduced through oral stories illustrated by action pictures to show the addition and the subtraction taking place. A composite picture is provided to help the children write the new facts.

Since dramatization and the use of concrete materials play such an important role in helping children visualize and learn the facts in addition and subtraction, both of these types of experience should be provided as new facts are introduced.

Dramatization. Stories such as the following may be dramatized:

John put 4 books on the reading table. Fred put 4 more books on the table. How many books were on the table in all? 4 books and 4 books are how many books?

Eight books were on the table. Mary took 4 of them. How many were left on the table? 4 books from 8 books is how many books?

Using concrete materials. Have the children place on their desks 4 small counting objects, place 4 more objects near them, and then find how many objects there are in all. Let a child write the example on the blackboard.

Then have the children place 8 objects on their desks, and take 4 away. Have a child write the subtraction example beside the addition example.

$$\begin{array}{r} 4 \\ +4 \\ \hline 8 \end{array} \qquad \begin{array}{r} 8 \\ -4 \\ \hline 4 \end{array}$$

Using Page 58

Have the children study the picture while the teacher tells this story:

One day 4 girls were swimming. Four more girls came to swim. How many girls were swimming then?

Have the children read the example in both the horizontal and vertical forms and write the answers. Then tell this story for the next picture:

Eight girls were swimming. Four of the girls came out of the water. How many girls were swimming then?

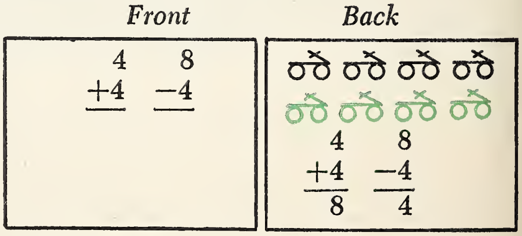
Have the children read the examples and write the answers. Then call attention to the composite picture. Have the children state the facts from the picture: "4 bathing suits and 4 bathing suits are 8 bathing suits." "4 bathing suits from 8 bathing suits is 4 bathing suits."

Have the children read the directions below the picture. Explain again that the word *facts* means the examples with their answers. Have the children trace the two examples and the answers.

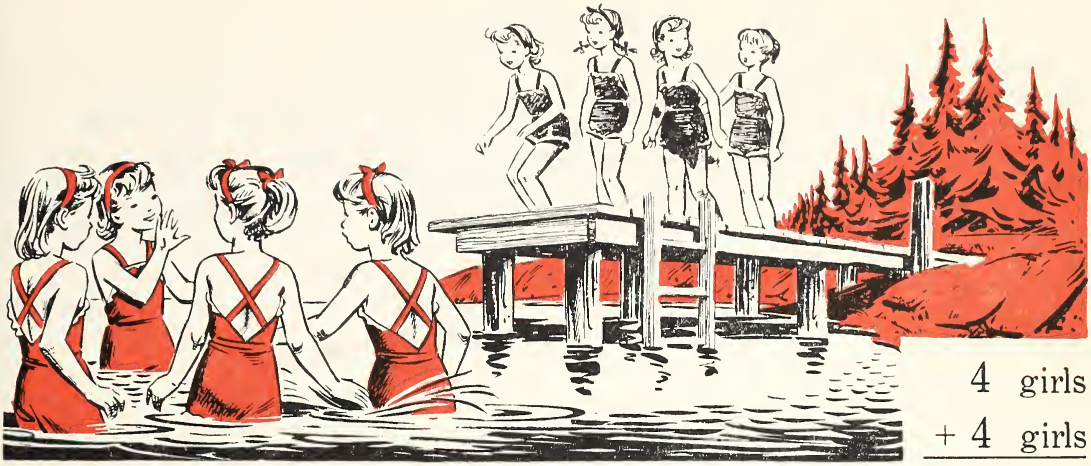
Follow-up Activities

Additional learning helps. If some of the slower learners need more help with the new facts, they may dramatize other stories using the facts, then build the two facts with concrete objects, and finally write the facts three or four times to fix them in mind.

These slower learners should make study cards, such as those illustrated, for each pair or group of facts as they are introduced. The cards should be large enough for a pair of facts or a group of four facts.



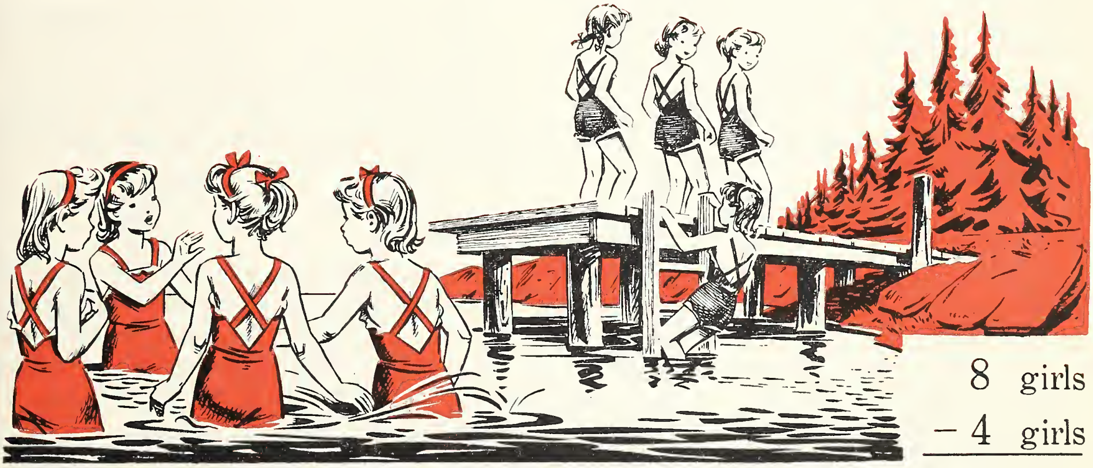
Enrichment activities. The faster learners may make separate cards, one for each new fact, illustrated as above.



4 girls
+ 4 girls

4 girls and 4 girls are ____ girls

____ girls



8 girls
− 4 girls

4 girls from 8 girls is ____ girls

____ girls

Write the two new facts.

$$\begin{array}{r} 4 \\ +4 \\ \hline 8 \end{array} \qquad \begin{array}{r} 8 \\ -4 \\ \hline 4 \end{array}$$

WORKING WITH GROUPS OF FIVE, FIVE, AND TEN

Preparatory Activities

The pupils now study groups of 5 and 5 and the group of 10 which they make when combined. They also study a group of 10 and find two groups of 5 within the 10. Page 59 provides material for these experiences.

Using concrete materials. Before doing the exercises in their books, the pupils should be given concrete experiences such as the following:

Arrange two rows of chairs, with 5 in each row. Ask the children how many are in each row. Then ask them how many there are altogether.

Have the children place on their desks 5 small counting objects, place 5 more near them, and then tell how many there are in all.

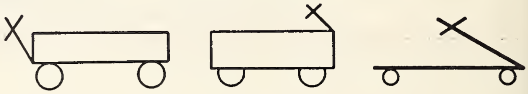
Arrange the chairs as a single group of 10. Have 5 chairs moved away from the others. Then ask the children how many chairs there are in all, and how many there are in each of the two smaller groups.

Now have the children place on their desks a group of 10 counting objects. Ask them to move 5 of the objects to one side and tell how many there are in all, and how many there are in each of the two smaller groups.

Using Page 59

Discuss the picture at the top of the page with the children. Then let them read and answer the questions.

Have them read and follow the directions in the next exercise. If they find pictures of wagons too difficult to draw, they may draw small squares or rectangles and pretend they are wagons. However, children enjoy making simple line drawings such as those shown in the next column.



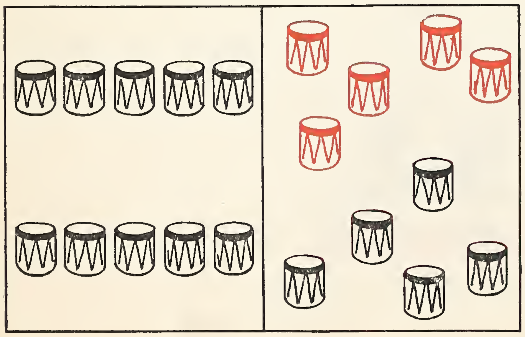
After they have drawn the two groups of 5 each, they are to write in the blank the number they drew altogether.

Call attention to the picture of the dolls. Then have the children read the questions and write the answers.

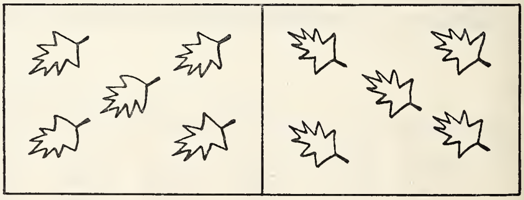
Follow-up Activities

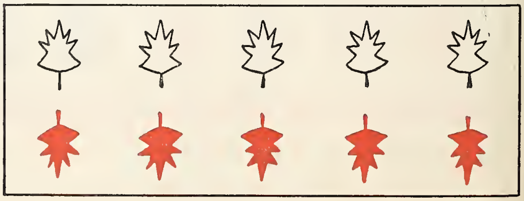
Additional learning helps. If some of the children need more experiences with groups of 5, 5, and 10, they may be given help similar to that suggested for preparatory activities.

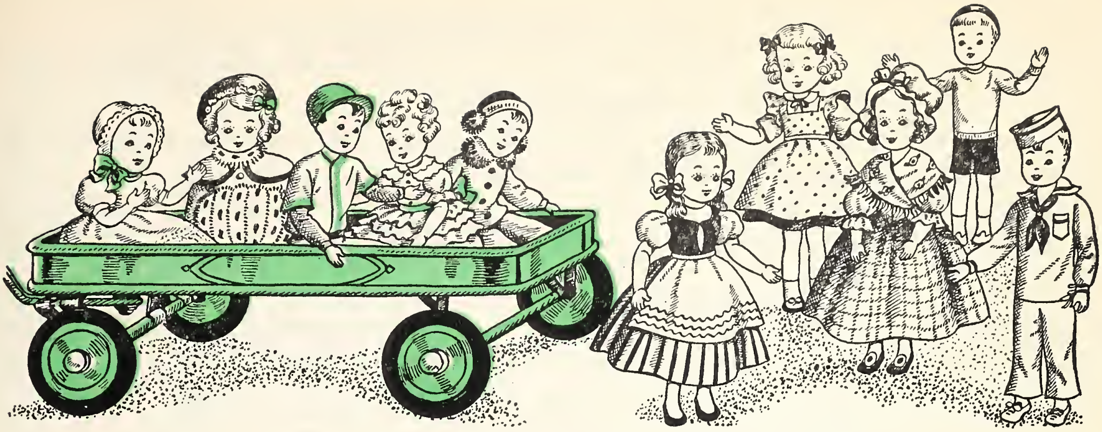
Each child may make a card for the groups of 5, 5, and 10 as shown below, or the children may use their own ideas.



Enrichment activities. The faster learners may make a set of the cards showing groups of 4, 4, and 8, and 5, 5, and 10 for the game table. They may be interested in making designs using groups of 8 or 10, as:





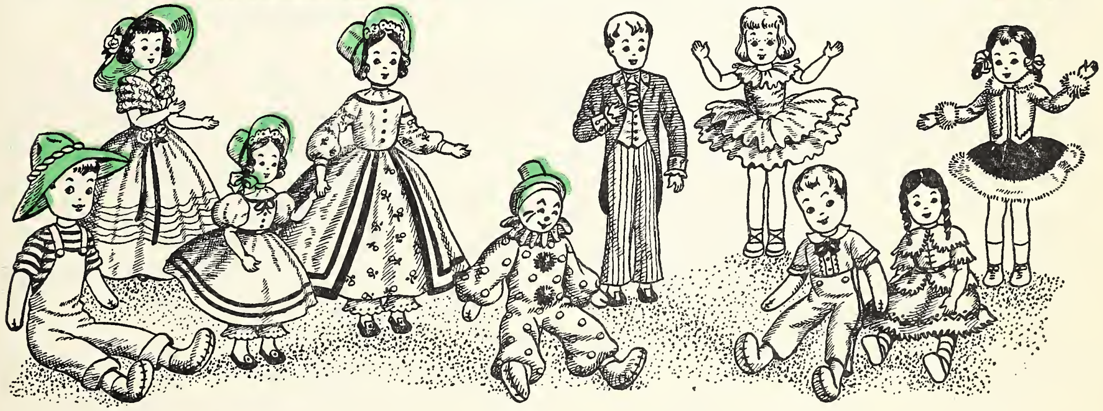


How many dolls are in the wagon? ____

How many are on the ground? ____

How many dolls are there? ____

Draw 5 wagons. Then draw 5 more wagons.		____



How many dolls are there? ____

How many of the dolls have hats? ____

How many have no hats? ____

LEARNING TWO NEW FACTS

Preparatory Activities

The two facts 5 + 5 = 10 and 10 − 5 = 5 are introduced on this page in oral stories illustrated with action pictures.

Dramatization. Have the children dramatize these two stories:

One day 5 lions were walking through the woods. Five more lions came to join them. Then how many lions were walking in the woods? How many are 5 lions and 5 lions?

Ten lions were walking in the woods. Some men caught 5 of the lions and took them away. How many lions were left in the woods? How many are 5 lions from 10 lions?

Have the children place on their desks 5 counting objects, place 5 more objects near them, and find how many there are in all. Have them write the fact as shown below. Then have them place 10 objects on their desks, move 5 away, find how many are left, and write the fact.

$$\begin{array}{r}5\\ +\ 5\\ \hline 10\end{array}\qquad\qquad\begin{array}{r}10\\ -\ 5\\ \hline 5\end{array}$$

Using Page 60

Have the children study the picture as this story is told:

One day the children went to the fair. Five children were riding the merry-go-round. Then 5 more children came to ride. How many children were riding then?

Have them read the example in both the horizontal and vertical form and write the answer in each case.

Tell this story as they study the second picture:

Ten children were riding on the merry-go-round. The merry-go-round stopped and 5 children got off. How many children were riding then?

Have the children read the examples and write the answers.

Call attention to the horses in the composite picture. Have the children state the two facts from the picture. Then have them read the direction below the picture and do what it tells them to do.

Follow-up Activities

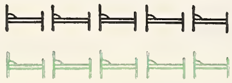
Additional learning helps. If some of the children need more experience with the new facts, the teacher may give them more stories to dramatize. The facts may then be built with counting objects and written three or four times to fix them in mind.

If these children are making study cards for the new facts, this pair may be put on a card as shown below:

Front

$$\begin{array}{r}5\\ +5\\ \hline \end{array}\qquad\begin{array}{r}10\\ -\ 5\\ \hline \end{array}$$

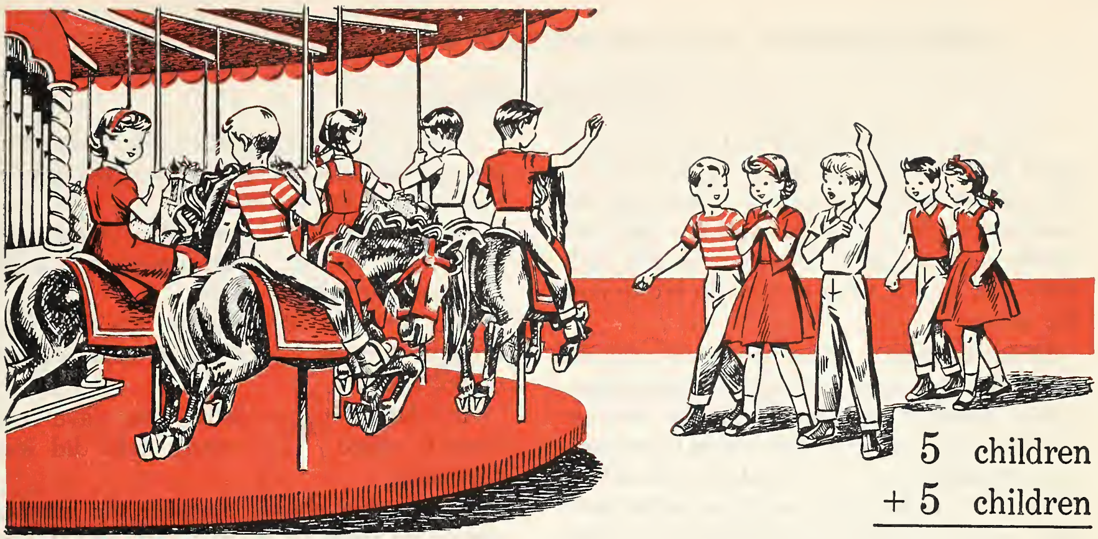
Back



$$\begin{array}{r}5\\ +5\\ \hline 10\end{array}\qquad\begin{array}{r}10\\ -5\\ \hline 5\end{array}$$

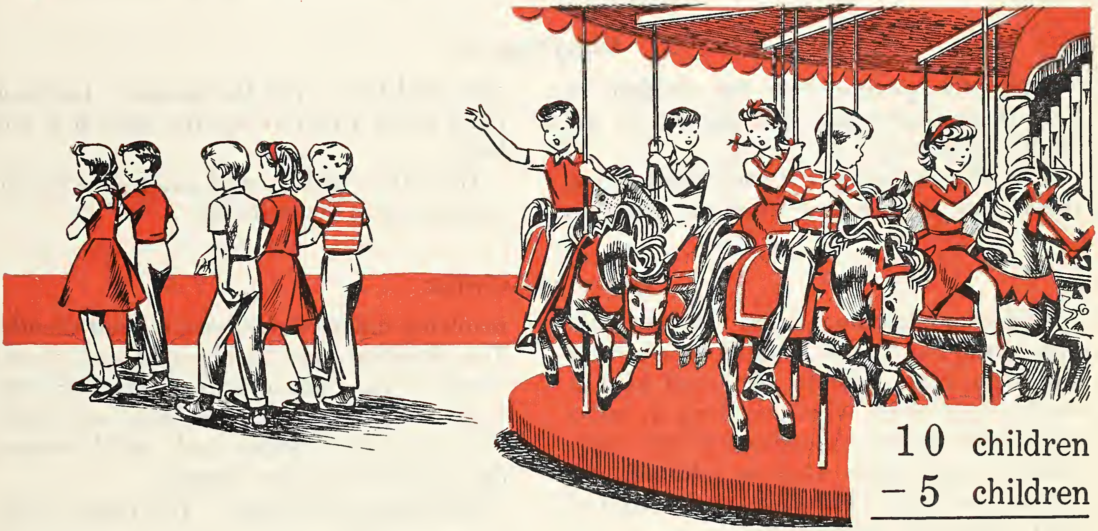
Enrichment activities. The faster learners may want to keep a chart of the facts. They will need one sheet of 1-inch square-ruled paper for addition and one for subtraction. The facts can be added as they are introduced. The addition chart below shows a suggested arrangement, but the pupils' charts should show answers.

1 1	1 2	1 3	1 4	1 5				
2 1	2 2	2 3	2 4					
3 1	3 2	3 3						
4 1	4 2		4 4					
5 1				5 5				



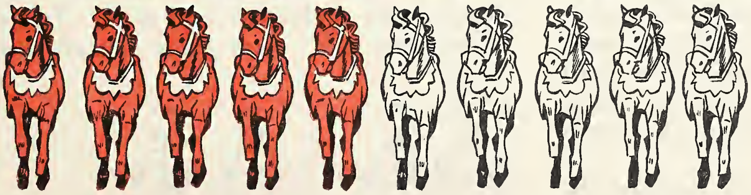
5 children
+ 5 children
____ children

5 children and 5 children are ____ children



10 children
− 5 children
____ children

5 children from 10 children is ____ children



5
+ 5
10

10
− 5
5

Write the two new facts.

USING ADDITION AND SUBTRACTION IN STORIES AND EXAMPLES

Preparatory Activities

On page 61 several of the new facts and some facts learned earlier are used in number stories and in examples. Some of the number stories describe action situations while others do not. The children read each story and decide what process to use to find the answer.

Dramatization. The children should dramatize or make pictures for some number stories before they attempt to do the exercise in their books. The stories should be written on the blackboard. The children should be directed to read silently, and think what each story tells and what the question asks. Then they may dramatize the stories or make pictures to show what the stories mean. These stories may be used:

Tom put 4 pencils on the table. Then Sue put 4 pencils on the table. How many pencils were on the table then?

Jane gave Edward 5 crayons. Mary gave him 1 more crayon. How many crayons did Edward have then?

Bob brought 2 cars to school. Ted brought 4 more. How many cars were at school then?

Ann had 5 paper dolls. She gave 3 of them to Alice. How many dolls did Ann have left?

The teacher should examine the number stories on page 61 to find any words that might cause difficulty. These words should be introduced as reading words before the children work with the page.

Using Page 61

Study the picture with the children to help them understand that the stories are about a pet store.

Tell the children to read each story, think what it tells and what the question asks, and then write the answer. Let each child make a picture for the story if it will help.

Have the children read and follow the direction above the examples.

Follow-up Activities

Additional learning helps. As the children work, the teacher should observe them and make note of those who need help in reading and those who need help in interpreting the stories. She also will find which children need more work on addition and subtraction facts. Then the specific kind of help needed can be provided.

If there were words which some children did not know, they should become familiar with them, since these words will occur frequently in problems on subsequent pages.

It is quite possible that the difficulty lay in the type of reading required for number stories. If so, having the children read a story and then tell it in their own words should help.

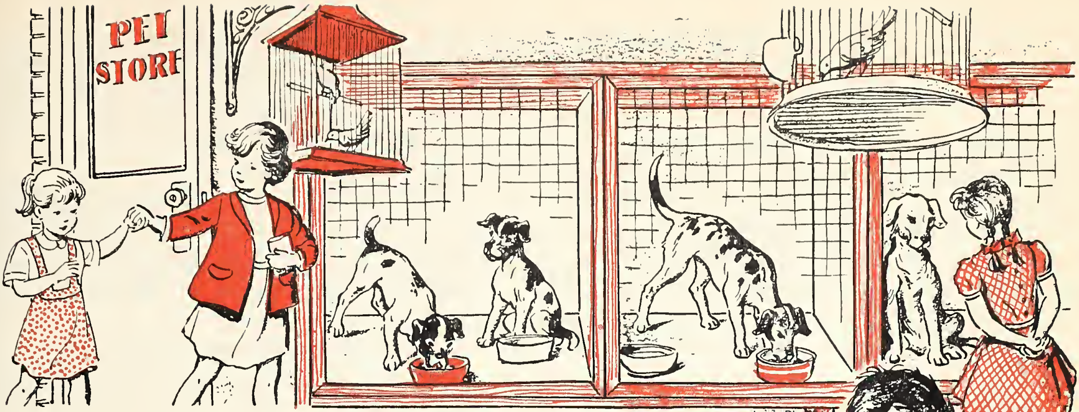
If the children are unable to interpret the situation, dramatizing the story will help. Then they should be given a similar story, involving different numbers, to read silently. The situation may be changed in the next story to give them practice in interpreting.

The children who need help with facts may study the practice cards which contain the specific facts they missed.

Enrichment activities. The faster learners may wish to draw, or find in magazines, pictures to illustrate number stories for their folders or scrapbooks, as:

There were 4 children in a store. Two of them were girls. How many of them were boys?

$$\begin{array}{r}4\\-2\\\hline 2\end{array}$$

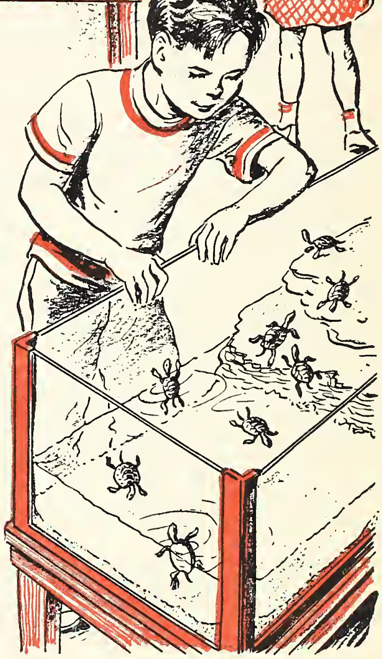


There were 8 dogs in the pet store.
Four of them had short tails.
How many of the dogs had long tails? ____

There were 10 turtles in the store.
A boy took 5 of the turtles away.
How many turtles were left? ____

Three girls came into the store.
Then 2 more girls came.
How many girls were in the store then? ____

There were 4 birds in the store.
A man came with 4 more birds.
How many birds were there then? ____



Add or subtract as the signs tell you.

4	5	6	4	5	3	1	10	5	2
− 3	+ 1	− 2	+ 4	− 4	+ 3	+ 4	− 5	− 3	+ 1

6	8	2	4	3	5	5	2	6	1
− 3	− 4	+ 3	− 1	+ 2	+ 5	− 2	+ 4	− 5	+ 2

WORKING WITH GROUPS OF SIX, ONE, AND SEVEN

Preparatory Activities

On page 62 the children work with a group of 6 and 1 more and discover that they make a larger group of 7 when combined. Then they examine a group of 7 to find the smaller group of 6 and 1 more within the larger group. The experiences parallel the four addition and subtraction facts which will be introduced on page 63 as a learning unit.

Using concrete experiences. It is important that the children see and understand all of the relationships involved in this learning situation. This can best be assured through the use of such concrete and realistic experiences as the following:

Arrange in the front of the room a group of 6 boys and 1 girl. Ask the children how many boys there are, how many girls, and how many children.

Then suggest that they look at the group in another way. Have the children tell how many girls there are in the group, how many boys, and how many children. Then lead the children to contribute the idea that it does not make any difference which way we arrange the groups—the number of children is the same.

Now arrange the 6 boys and 1 girl in a group again. Ask the 6 boys to stand at one side and the 1 girl at the other. Ask how many children there are, how many boys, and how many girls.

Arrange the children with the girl on the opposite side. Then ask again how many children there are, how many girls, and how many boys.

Direct the children to make four groups with small counting objects, as:

Place 6 buttons on your desk. Place 1 more button near it. How many buttons are there in all?

Place 1 button on your desk. Place 6 more buttons near it. How many buttons are there in all?

Place 7 more buttons on your desk. Move 6 of them to one side. How many buttons are there in all? How many did you move away? How many did you leave?

Place 7 buttons on your desk. Move 1 of them to one side. How many did you leave?

Using Page 62

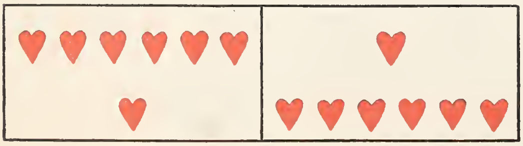
Have the children study the first two pictures and write the answers to the questions.

For the next two exercises, have them read the directions, draw the pictures of horses, and write in each blank the number of horses they drew. The horses may be very simple line drawings, as illustrated.

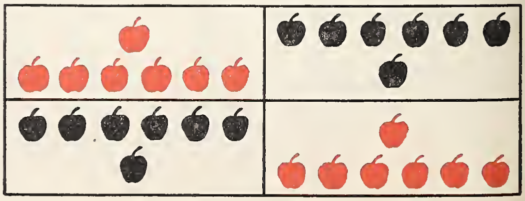
Next, have the children read the questions about the animals and write the answers in the blanks.

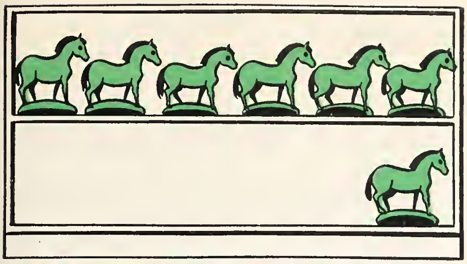
Follow-up Activities

Additional learning helps. If some of the children need more help with groups, they may be given further experiences with concrete objects. Then they may make a card to show the groups of 7.



Enrichment activities. The children who do not need help with groups may make designs with groups of 7, as:

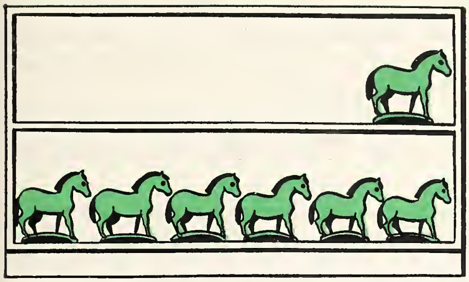




How many horses are at the top? ____

How many are at the bottom? ____

How many horses are there? ____



How many horses are at the top? ____

How many are at the bottom? ____

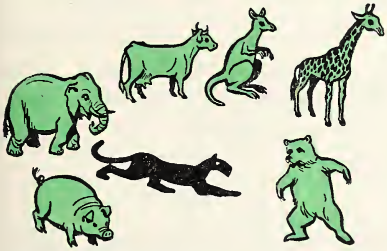
How many horses are there? ____

Draw 6 horses.

Then draw 1 more horse. ____

Draw 1 horse.

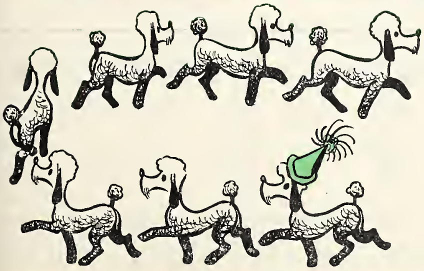
Then draw 6 more horses. ____



How many animals are there? ____

How many of the animals are green? ____

How many are black? ____



How many dogs are there? ____

How many of the dogs have hats? ____

How many have no hats? ____

LEARNING FOUR NEW FACTS

Preparatory Activities

The first learning unit of four related facts, $6+1=7$, $1+6=7$, $7-6=1$, and $7-1=6$, is introduced on page 63 in oral stories illustrated by action pictures.

Dramatization. The children may dramatize these stories to discover the new facts:

Six rabbits were eating lettuce in a garden. One more rabbit came. Then how many rabbits were in the garden? How many are 6 rabbits and 1 rabbit?

The farmer came into the garden and 1 rabbit hid under the wheelbarrow. Then 6 more rabbits went under the wheelbarrow. How many rabbits were under the wheelbarrow then? How many are 1 rabbit and 6 rabbits?

The farmer found the 7 rabbits under the wheelbarrow. Six of the rabbits hopped away. Then how many rabbits were under the wheelbarrow? How many are 6 rabbits from 7 rabbits?

The 7 rabbits ran to the gate. The farmer caught 1 rabbit. How many rabbits got away? How many are 1 rabbit from 7 rabbits?

Using concrete objects. Next, direct the children to discover the new facts with their counting objects, as:

Place 6 counters on your desk. Place 1 more counter below them. How many are 6 and 1?

Place 1 counter on your desk. Place 6 more counters below it. How many are 1 and 6?

Place 7 counters on your desk. Now take 6 counters away. 6 from 7 is how many?

Place 7 counters on your desk again. Now take 1 counter away. 1 from 7 is how many?

Using Page 63

Have the children study the pictures as these stories are told. Then have them read the examples and write the answers.

Some boys worked all day building a hut. In the morning 6 boys were building the hut. One more boy came to help. How many boys were building in all?

One boy was carrying wood for the hut. Six more boys came back to help him. How many boys were carrying wood then?

The 7 boys were building the hut when lunch time came. Six boys went home for lunch. How many boys did not go home?

Late in the afternoon the 7 boys were finishing the hut. One boy went home. How many boys were left to finish the hut?

Help the children use the picture of hammers to state the four related facts. Then help them read the sentence below the picture and trace the four facts.

Follow-up Activities

Additional learning helps. If some of the children need more help with the four new facts, let them build the facts again with their counting objects, write each fact three or four times, and make study cards.

Front

$\begin{array}{r} 6 \\ +1 \\ \hline \end{array} \quad \begin{array}{r} 1 \\ +6 \\ \hline \end{array} \quad \begin{array}{r} 7 \\ -6 \\ \hline \end{array} \quad \begin{array}{r} 7 \\ -1 \\ \hline \end{array}$

Back

$\begin{array}{r} 6 \\ +1 \\ \hline 7 \end{array} \quad \begin{array}{r} 1 \\ +6 \\ \hline 7 \end{array} \quad \begin{array}{r} 7 \\ -6 \\ \hline 1 \end{array} \quad \begin{array}{r} 7 \\ -1 \\ \hline 6 \end{array}$

Enrichment activities. The faster learners may make separate single cards for each new fact as shown below:

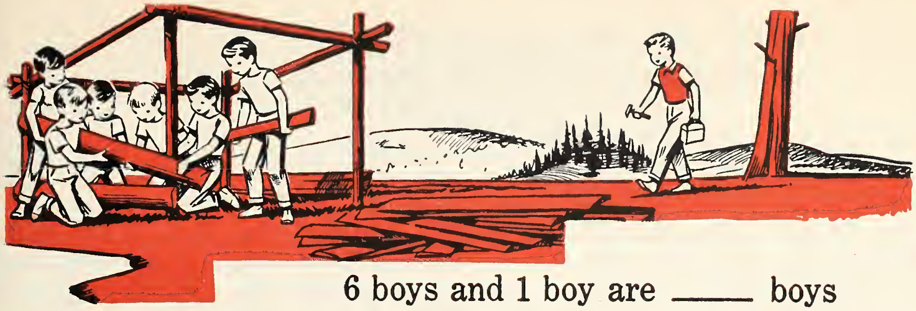
▲△△△△△△

$\begin{array}{r} 1 \\ +6 \\ \hline 7 \end{array}$

□□□□□□■

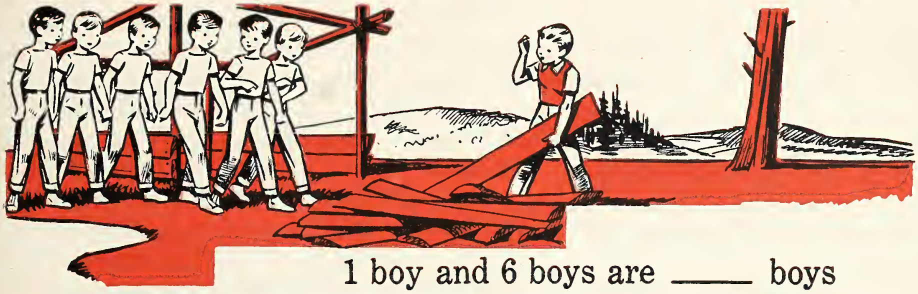
$\begin{array}{r} 7 \\ -1 \\ \hline 6 \end{array}$

Those children who are charting the facts may record the four new facts.



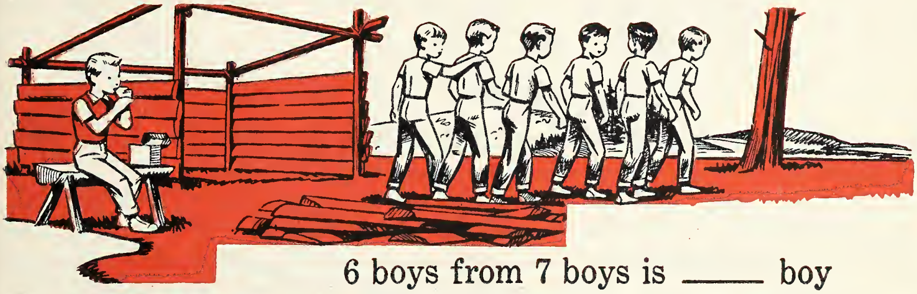
6 boys and 1 boy are ____ boys

6 boys
+ 1 boy
____ boys



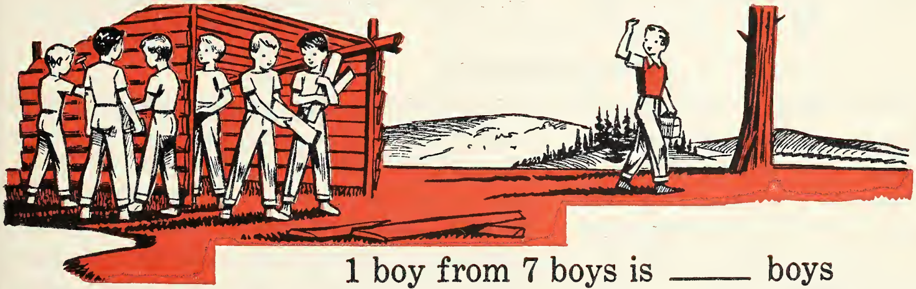
1 boy and 6 boys are ____ boys

1 boy
+ 6 boys
____ boys



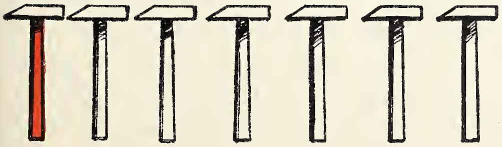
6 boys from 7 boys is ____ boy

7 boys
− 6 boys
____ boy



1 boy from 7 boys is ____ boys

7 boys
− 1 boy
____ boys



6
+ 1

1
+ 6

7
− 6

7
− 1

Four facts have 6, 1, and 7
in them. Write the four facts.

USING ADDITION AND SUBTRACTION IN NUMBER STORIES AND EXAMPLES

Preparatory Activities

Three of the new facts and two that were learned earlier are used in the number stories on page 64. The children decide which process to use in finding the answer for each problem. All of the new facts appear in the practice exercise.

Reading number stories. Since one of the most difficult things the children need to accomplish in Grade Two is to learn to read and interpret number stories, the teacher should continue to give guidance and help. The children will be more likely to succeed with the exercise in their books if they are given experiences such as the following before they use the book.

Write on the blackboard these, or similar, number stories for the children to read silently and then answer. If they have trouble, help them dramatize the stories or illustrate them.

One day the children helped at school. One boy and 6 girls helped to put the books away. How many children helped with the books?

There were 10 chairs at the reading table. John put 5 of them at the back of the room. How many chairs were at the table then?

Four boys and 4 girls brought flowers for the room. How many children brought flowers?

The teacher should examine the stories in the pupil's book in order to anticipate vocabulary difficulties, and introduce the words before the children do the exercise. This is particularly necessary for the slower learners.

Using Page 64

Suggest to the children that they read each story, think what happens in it and what the question asks, and then find the answer. They may make pictures for the stories if they need help in finding the answers.

Have them read the direction above the examples. Then they may do what it tells them to do.

The teacher should watch closely for children who need help. A few words of encouragement or a suggestion will frequently enable a child to proceed successfully with an exercise that is causing difficulty.

Follow-up Activities

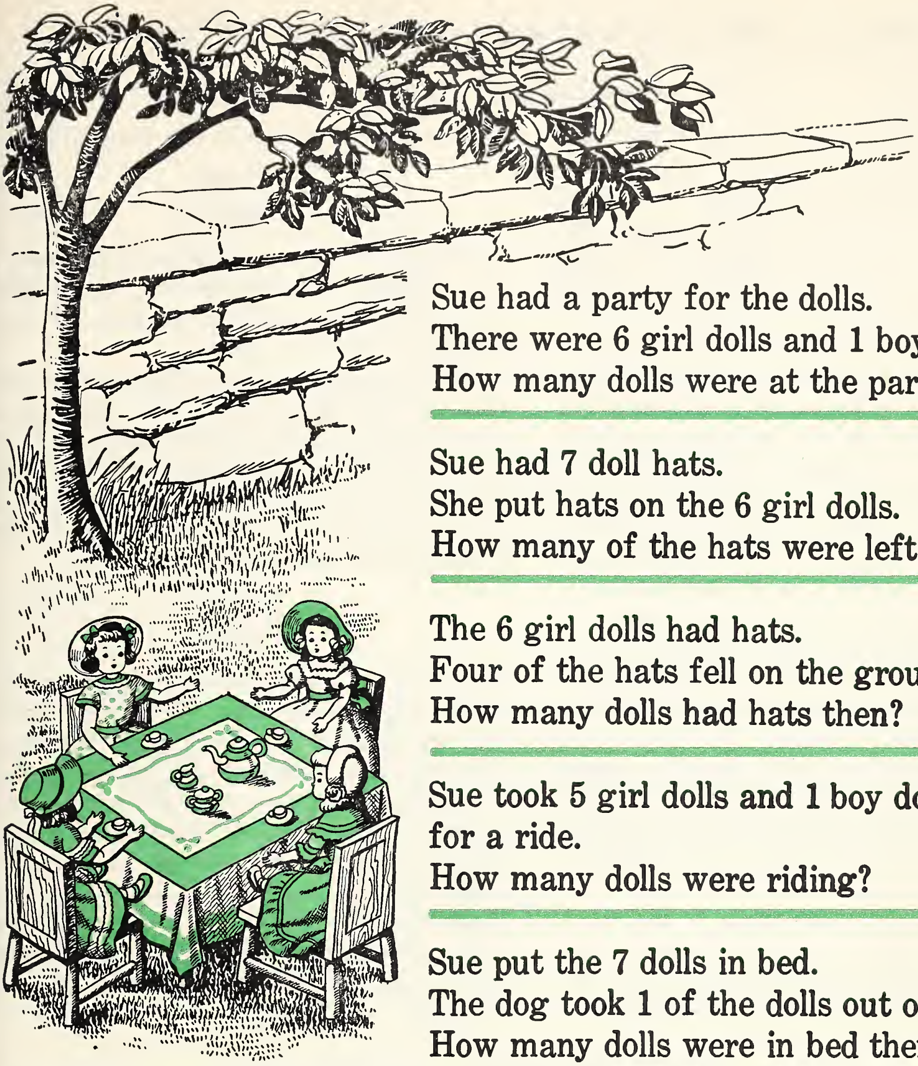
Additional learning helps. The teacher will find it helpful to go over the number stories with the children who had difficulty. Sometimes questions may be asked by the teacher to guide the rereading and help with the interpretation of the stories. With the first story, ask, for example:

What kind of party was it? Who was there? What does the question ask?

The children should be helped to correct the mistakes they made in their books. This serves two purposes: (1) as they look back at the page later, they see the correct rather than the incorrect answer; (2) the corrected page shows the child that he succeeded when he tried again.

The children who made mistakes in the facts should work them out with concrete materials to find the right answers. Then they should study the cards which show the specific facts they missed. After they are *sure* of the correct answers for the facts they missed, they should write those facts three or four times.

Enrichment activities. The children who had no difficulty with page 64 may be asked to make clockfaces to use in an exercise to come soon. Paper pie plates may be used for the clockfaces if they are available, and cardboard hands may be cut out. Otherwise, the children should be given a pattern for cutting the circles from art paper.



Sue had a party for the dolls.
There were 6 girl dolls and 1 boy doll.
How many dolls were at the party? ____

Sue had 7 doll hats.
She put hats on the 6 girl dolls.
How many of the hats were left? ____

The 6 girl dolls had hats.
Four of the hats fell on the ground.
How many dolls had hats then? ____

Sue took 5 girl dolls and 1 boy doll
for a ride.
How many dolls were riding? ____

Sue put the 7 dolls in bed.
The dog took 1 of the dolls out of bed.
How many dolls were in bed then? ____

Add or subtract, and write the answers.

3	6	5	2	6	8	1	7	4	2
+ 1	− 1	+ 5	− 1	+ 1	− 4	+ 5	− 6	+ 1	+ 2
3	4	6	7	1	5	1	3	10	1
− 1	+ 4	− 4	− 1	+ 3	− 1	+ 6	− 2	− 5	+ 1

FINDING HOW MANY OR HOW MUCH MORE OR LESS

Preparatory Activities

The subtraction process was introduced with the "take away and tell how many are left" idea, and that concept has been used exclusively up to this time. On page 65 subtracting to find how many more there are in one group than in another or to find how much more or how much less one quantity is than another is developed.

In past experiences involving subtraction, the children have been able to illustrate the minuend and mark out or take away the number to be subtracted. In this new situation they will need to compare one group with another to find how many more there are in the larger group or to compare one quantity with another to see how much more or how much less one is than the other.

Using concrete materials. This new concept of subtraction should be introduced through realistic situations and concrete materials, as suggested below:

Arrange in the front of the room two rows of chairs with 6 in one row and 4 in the other. Have them lined up so the children can see that there are more in one row than the other. Then ask:

How many chairs are there in the front row? How many in the back row? Are there more chairs in the front or in the back row? How many more chairs are there?

Write the example on the blackboard:

$$\begin{array}{l} 6 \text{ chairs} \\ \underline{4 \text{ chairs}} \end{array}$$

Ask what we did to find that there were 2 more chairs in the front row than in the back row. Help the children see that we may subtract to find the answer.

Place on a table a row of 7 pennies and another row of 6 pennies. Line them up so that the children can see that there are more in one row than the other. Then ask them how much money there is in the top row; in the bottom row. Write the amounts on the blackboard in example form.

$$\begin{array}{l} 7 \text{ cents} \\ \underline{6 \text{ cents}} \end{array}$$

Ask them to find how much more money there is in the top row. Write the answer and try to get from the children the statement that they subtracted to find the answer.

Place on the table a row of 4 pennies and a row of 3 pennies. Ask how much money there is in each row. Write the example. Then ask how much less money there is in the bottom row than in the top row. Write the answer and help the children see that we subtract to find how much less there is of one thing than of another.

Using Page 65

Call attention to the dolls. Then tell this story:

Mary had 6 dolls. Ruth had 5 dolls. How many more dolls did Mary have than Ruth?

Let the children read the question in the book and write the answer.

Follow the same procedure as you tell these stories for the next two exercises:

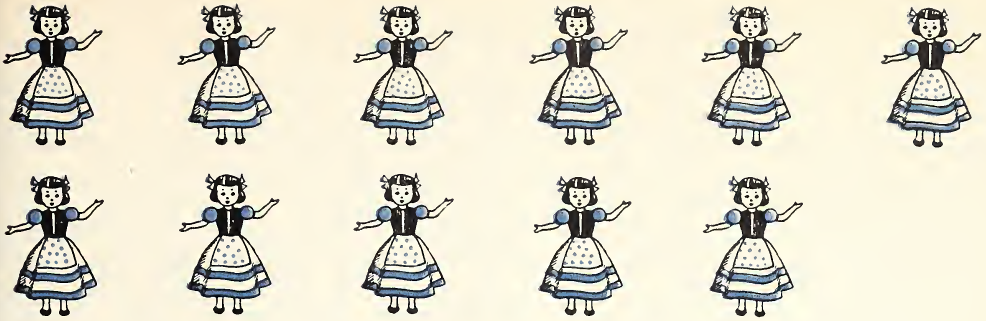
Sue had 5 cents. Bob had 2 cents. How much more money did Sue have than Bob?

Tom had 10 cents. Bill had 5 cents. How much less money did Bill have than Tom?

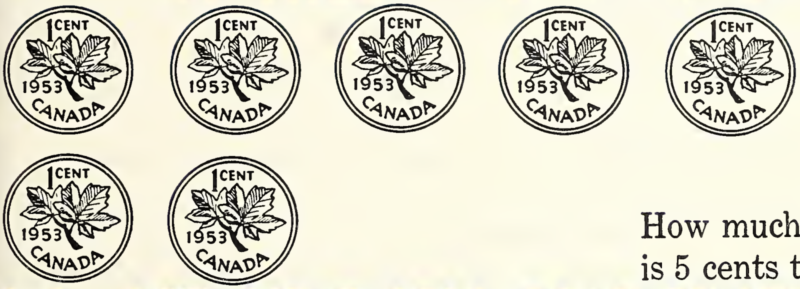
Let the children read the other stories. If they have difficulty, they may make pictures for them. If they do so, they should pair the objects so that they can find the remainder.

Follow-up Activities

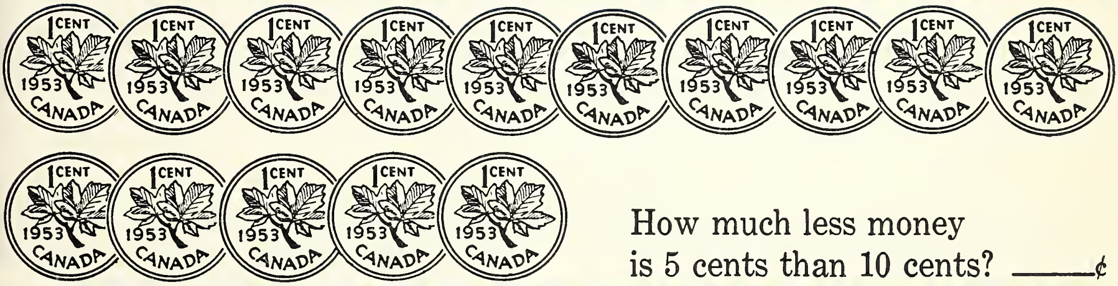
Additional learning helps. If some of the children had difficulty in understanding this concept of subtraction, they may use counting objects to find the answer to such questions as these: How many more are 7 blocks than 1 block? How much more is 4 cents than 2 cents? How much less is 4 cents than 8 cents?



6 dolls is how many more than 5 dolls? ____



How much more money
is 5 cents than 2 cents? ____¢



How much less money
is 5 cents than 10 cents? ____¢

John made 4 wagons. Mary made 1 wagon.
How many more wagons
did John make than Mary?

Subtract, and write the answer. ____

John had 5 cents. Dick had 3 cents.
How much less money
did Dick have than John? ____¢

A bed costs 5¢. A ball costs 1¢.
How much more money does
the bed cost than the ball? ____¢

USING MONEY; NUMBERS TO 100

Preparatory Activities

Page 66 serves three purposes: (1) it gives practice in recognizing the coins and indicating the amount of money each represents, (2) it reviews the meaning of two-place numbers, and (3) it provides practice in writing the numbers from 1 to 100.

The children should be able without preparation, to recognize the coins on page 66 and tell how many cents they are worth. They should need no help in writing the numbers from 1 to 100. The exercises on page 66 will indicate whether or not they can do these things.

Reviewing two-place numbers. Before the page is used, the children should review the rather difficult concept of two-place numbers through concrete experiences such as the following:

Have the children use bundles of ten and single sticks to show how many tens and ones there are in such numbers as 15, 23, 38, 47, 56, 60, 74, 82, 91, and 100. Then write these statements on the blackboard and let the children fill the blanks.

12 is ____ ten and ____ ones
27 is ____ tens and ____ ones
49 is ____ tens and ____ ones
61 is ____ tens and ____ one
80 is ____ tens and ____ ones

Using Page 66

The children are to examine each coin and write on the blank below it the number which tells how many cents the coin means.

In the next exercise the children are to read each number and write in the blanks the number of tens and ones it means.

Have the children read the direction above the boxes to find what numbers they are to write in the boxes. A few models are provided to indicate that the numbers are to be written in columns from 1 to 10, 11 to 20, and so on, to 100.

Follow-up Activities

Additional learning helps. Actual coins or toy money may be used to help those who need assistance in recognizing the coins and understanding their value. The suggestions given for preparatory activities on page 116 of this book may be used again.

The bundles of 10 counting objects may be used to help any children who still do not understand the meaning of two-place numbers. The meaning of each of the numbers on page 66 that the children failed to analyze correctly should be demonstrated with the bundles and single objects.

If some children need help with the number sequence to 100, use the charts made earlier. (See pages 108–110.) The chart with numbers will help the children find which numbers they omitted or wrote in the wrong order. The illustrated chart may be used for counting to review the number sequence.

If some children need help in forming the figures legibly, models may be provided for tracing. Then they may practise making the specific numbers that caused difficulty.

Enrichment activities. Some of the children who need no help at this time may be interested in drawing some large clockfaces on a long piece of wrapping paper to make a chart about telling time. Others may use the yardstick to draw lines 2 inches apart on another piece of wrapping paper for the room newspaper.

Today's News

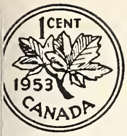
Today is Monday.

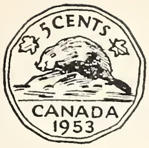
The sun is shining.

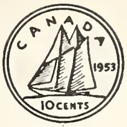
Tom brought a goldfish

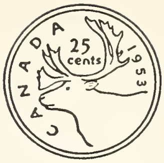
for our aquarium.

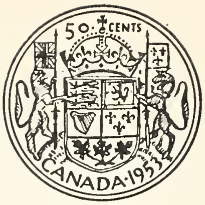
We are building a train.











_____ cent _____ cents _____ cents _____ cents _____ cents

---

17 is _____ ten and _____ ones

29 is _____ tens and _____ ones

36 is _____ tens and _____ ones

45 is _____ tens and _____ ones

50 is _____ tens and _____ ones

62 is _____ tens and _____ ones

84 is _____ tens and _____ ones

98 is _____ tens and _____ ones

Write the numbers from 1 to 100.

1	11	21							
10	20								

LEARNING TO TELL TIME BY THE HALF HOUR

Preparatory Activities

Page 67 provides material to be used in helping the children learn to tell time to the half hour. Since they have had experience in telling time to the hour, this is merely an extension of that ability.

Using concrete experiences. An actual clock with synchronized hands should be used to demonstrate to the children that the minute hand moves all the way around the clock's face while the hour hand moves from one number to the next, and that the minute hand moves half of the way around the clock's face while the hour hand moves half of the way from one number to the next.

The children should review telling time by the hour. If they made clockfaces of cardboard with movable hands earlier, these may be used again. The hands should be set at various hours, with the long hand on 12 and the short hand pointing to the hour, and the children asked to tell what time the clock shows. They should be able to identify the hour hand and the minute hand, and demonstrate the direction in which the hands move.

The teacher may name the hours 1 o'clock, 2 o'clock, etc., and have the children set their clocks accordingly.

Next, the teacher may set the real clock at 2 o'clock, and ask the children to watch while the hands move, and note that the long hand moves to the 6 while the short hand goes half of the way from the 2 to the 3. It should be made clear that the 6 on the clockface marks the halfway place on the face; that it is half past 2 because the short hand has gone past the 2 and half of the way to the 3, and the minute hand has gone half of the way around the clockface.

Move the hands to show 3 o'clock, calling attention to their positions. Then move them to half past 3, etc., calling attention to each hour and half hour.

Let the children set their clocks to show various times as the teacher names them or writes them on the blackboard.

Using Page 67

Discuss the picture at the top of the page, and have the children find what time the television program begins. Let them read the sentences and fill the blanks.

Call attention to the next picture, and ask the children to find what time the television program ends. Let them read the sentences and fill the blanks.

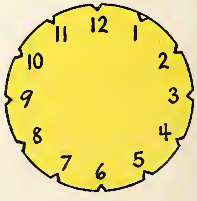
In the third exercise the children read the time on each clock and fill the blank.

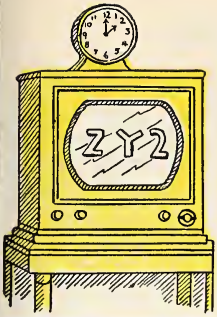
In the last exercise they are to draw minute hands on the clockfaces to show the time.

Follow-up Activities

Additional learning helps. If some of the children had difficulty with page 67, they should be given more experiences with real or paper clocks as suggested for preparatory activities. A paper pie plate, two pieces of cardboard for the hands, and a paper fastener with a round head are excellent to use to make the clockfaces. The child may make a design around the rim of the pie plate to make it more attractive.

Enrichment activities. The faster learners may make a chart to show important events in the school day, and show on clockfaces when they occur. The children may be given a large cardboard circle, such as the one shown, to use as a pattern for drawing the clockfaces on the chart. The pattern should show the numbers and should have small notches to indicate the correct places to put the numbers on the clockfaces.

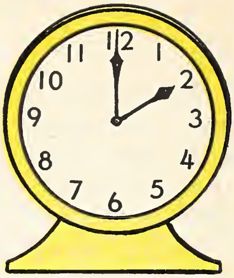


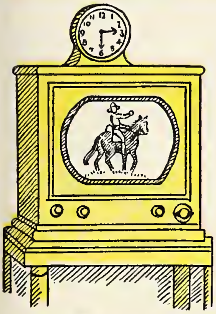


The short hand points to ____.

The long hand is at ____.

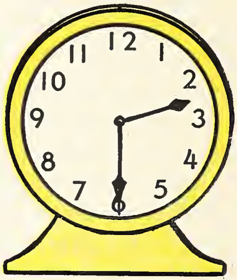
It is ____ o'clock.



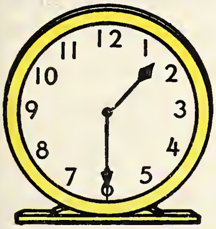


The short hand has gone past 2.
The long hand has gone half of the way around the clock.

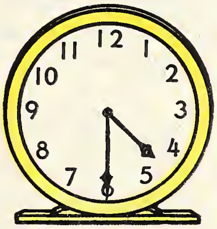
The long hand is at ____.
It is half past 2.



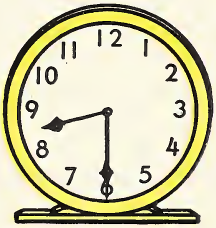
Tell what time it is.



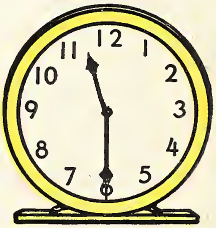
half past ____



half past ____

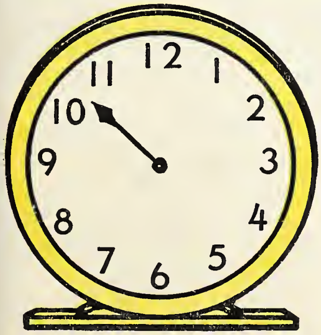


half past ____

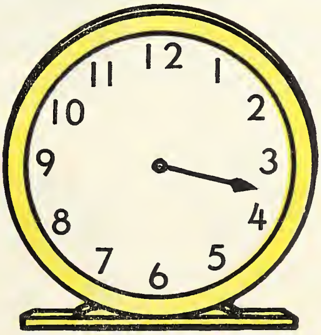


half past ____

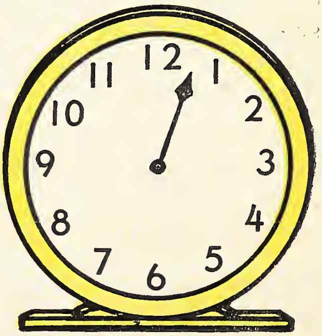
Make the clocks tell the time.



half past 10



half past 3



half past 12

WORKING WITH GROUPS OF FOUR, THREE, AND SEVEN

Preparatory Activities

The children will examine groups of 4, 3, and 7 on page 68. The purpose will be to learn more about the number 7 and to prepare for the introduction of a new unit of addition and subtraction facts.

Using concrete experiences. Before the children use this page, they should be given concrete experiences such as the following:

Arrange in the front of the room a group of 7 boys. Give 4 of them books and 3 of them pencils. Have the children find how many boys have books, how many have pencils, and how many boys there are. Next have the children find how many boys have pencils, how many have books, and how many boys there are in all.

Ask the children to tell again how many boys there are. Have all the boys with books move to one side. Then ask how many there are in each group—4 and 3.

Bring the groups together again and have the children repeat the number in the whole group. Then have the 3 boys with pencils move to one side. Let the children identify the groups of 3 and 4.

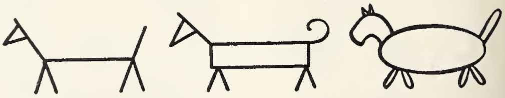
Have the children use counting objects for this activity:

Ask each child to place on his desk 4 objects, then 3 more, and tell how many there are in all. Then have him place on his desk 3 objects, then 4 more, and tell how many there are in all. Now ask him to place 7 objects in a group, move 4 to one side, and find how many were not moved. Have him place 7 objects in a group, move 3 to one side, and find how many were not moved.

Using Page 68

Call attention to the picture at the top of the page. Bring out the fact that some of the puppies are in the basket and some are out. Have the children read the questions and write the answers in the blanks.

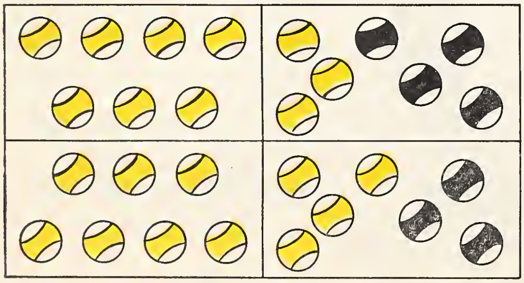
In the next two exercises, have the children draw the pictures as the directions tell them, and then write the numbers that tell how many they drew. The puppies may be simple line drawings as shown here, or the children may make circles, squares, or lines to represent the puppies.



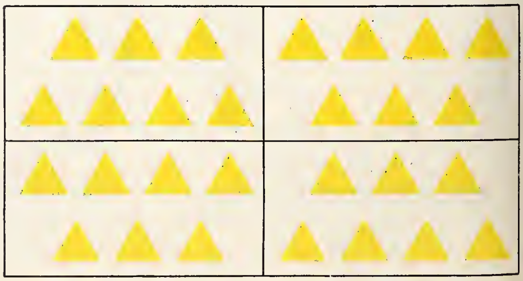
In the last two exercises, have the children study the pictures, then write the answers.

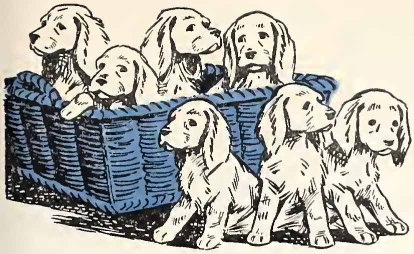
Follow-up Activities

Additional learning helps. The slower learners may be given more work with concrete objects. Then they may discover the groups by drawing. If these children are making a set of cards showing groups, a simple card may be made as shown below:



Enrichment activities. The faster learners may work on any unfinished arithmetic activities they have started. They may be interested in making designs to illustrate a group of 7 with smaller groups of 4 and 3 in it for the game table or for their folders.

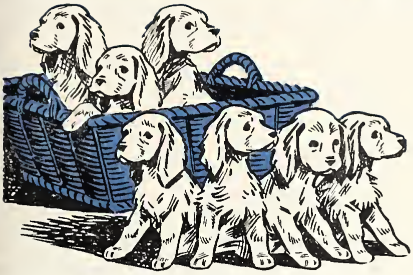




How many puppies are in the basket? ____

How many are out of the basket? ____

How many puppies are there? ____



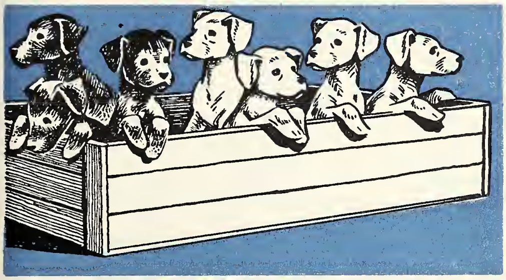
How many puppies are in the basket? ____

How many are out of the basket? ____

How many puppies are there? ____

Draw 4 puppies.
Then draw 3 more puppies. ____

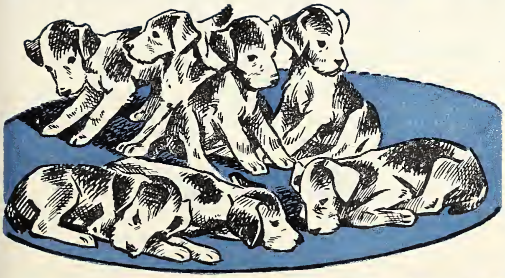
Draw 3 puppies.
Then draw 4 more puppies. ____



How many puppies are there? ____

How many are white? ____

How many are black? ____



How many puppies are there? ____

How many are sleeping? ____

How many are not sleeping? ____

LEARNING FOUR NEW FACTS

Preparatory Activities

On page 69 the new facts $4 + 3 = 7$, $3 + 4 = 7$, $7 - 4 = 3$, and $7 - 3 = 4$ are introduced in illustrated number stories to be told by the teacher. Then the facts are discovered from a composite picture and written in the abstract form.

Dramatization. The teacher may ask the children to state number stories to be dramatized. If the children have no stories to suggest, these may be told and dramatized:

In a pet parade 4 dogs were riding in one wagon, and 3 dogs were riding in another wagon. How many dogs were riding in the wagons?

There were 3 kittens in a basket and 4 kittens in a box. How many kittens were in the parade?

The boys had 7 rabbits in the parade. They let 4 rabbits get away. How many rabbits were in the parade then?

The girls had 7 ducks in a box. Three of the ducks jumped out and waddled away. How many ducks were in the parade then?

Have the children build the new facts with their counters. Each child may place on his desk 4 counters and 3 counters and tell how many he has. Then he may place on his desk 3 counters and 4 counters and find how many there are in all. Next have him place 7 counters on his desk, move 4 of them away from the group, and find how many are left. Then have him place 7 counters on his desk again, move 3 of them away, and find how many are left.

Using Page 69

Let the children discuss the pictures of the children playing in the snow. Then have them write the answers for the examples after a story has been told for each picture. The following stories may be used:

The boys have lined up 4 large snowballs. They are rolling 3 more snowballs. How many snowballs will there be in all?

Three boys are making a snow fort. Four more boys are coming to help. How many boys will be building the fort then?

Seven girls were making animals of snow. Four of the girls went away. How many girls were making snow animals then?

The girls made 7 snow animals. Three of the animals melted in the sun. Then how many snow animals were left?

Have the children find the groups of 4 and 3 in the picture of the 7 stocking caps, and let them state the four new facts. Then have them read the directions and write the four new facts.

Follow-up Activities

Additional learning helps. The children may dramatize other stories using the facts, build the facts with their counters, and write the facts. They may make illustrated cards, such as the one shown below.

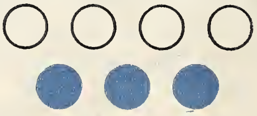
Enrichment activities. The faster learners may make a single card for each fact, as shown below, to add to the sets on the game table. They may also make a card for the four facts together, as shown at the left.

Front

$$\begin{array}{rrrr} 4 & 3 & 7 & 7 \\ +3 & +4 & -4 & -3 \\ \hline \end{array}$$

Back

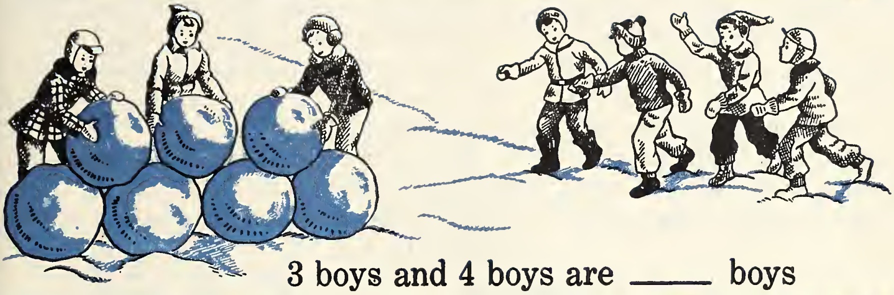
$$\begin{array}{rrrr} 4 & 3 & 7 & 7 \\ +3 & +4 & -4 & -3 \\ \hline 7 & 7 & 3 & 4 \end{array}$$



$$\begin{array}{r} 7 \\ -3 \\ \hline 4 \end{array}$$

4 snowballs and 3 snowballs are ____ snowballs

4 snowballs
+ 3 snowballs
____ snowballs



3 boys and 4 boys are ____ boys

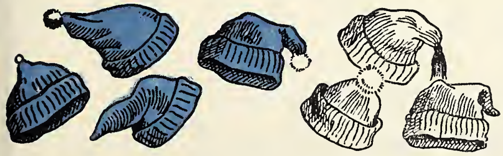
3 boys
+ 4 boys
____ boys

4 girls from 7 girls is ____ girls

7 girls
− 4 girls
____ girls

3 animals from 7 animals is ____ animals

7 animals
− 3 animals
____ animals



Four facts have 4, 3, and 7
in them. Write the four facts.

4
+3
____

+ ____

---- ____

---- ____

USING ADDITION AND SUBTRACTION IN NUMBER STORIES AND EXAMPLES

Preparatory Activities

Soon after the facts are introduced, they should be used in number stories and examples. The exercises on page 70 provide for the use of some of the new facts and others that were introduced earlier.

Reading number stories. Stories such as the following may be written on the blackboard for the children to read and answer. The children should think what each story tells and what the question asks before they try to write the answer. If difficulty is encountered, the teacher may help the children read the stories by asking guiding questions.

The children were reading in the library. Mary found 6 books about animals and 1 story book. How many books did Mary find?

Tom saw 8 books about cowboys. He had read 4 of the books. How many books about cowboys did Tom have left to read?

Alice found 3 books about trains and 4 about boats. How many books did she find about travel?

The teacher should examine the stories in the pupil's book and introduce any of the words which she thinks the children will find difficult to read.

Using Page 70

Have the children determine from the pictures what the number stories are about. Remind them to think what each story tells and what the question asks before they write the answer. They should read the stories silently and find the answers while the teacher observes and gives help where it is needed.

Have the children read the directions above the examples at the bottom of the page and follow the directions, writing the answers to the examples.

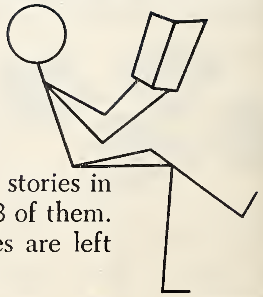
Follow-up Activities

Additional learning helps. If some of the children had difficulty with the problems in the book, the teacher should go over the exercise with them again and help them find out why they made mistakes. The number stories may be read orally and discussed; then pictures may be made by the children to show what each story tells. Sometimes reading the question again points up the situation.

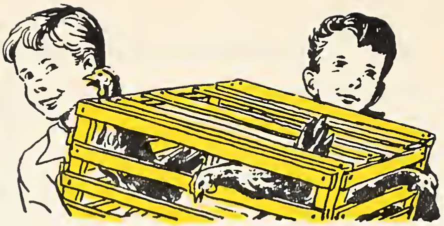
Those children who missed examples may build the facts with their counters. Then they may write each fact when they are sure of it. The children may work in small groups, and, to check each other, may use the cards for the facts they missed.

Enrichment activities. The children who need no help at this time may be interested in starting a set of number story cards for the game table. They may cut cards about 9 inches by 12 inches. One number story may be written on each card. The list of facts that have been learned may be used as a guide. As a story is made that uses a fact, it should be checked so there will be only one story for each fact.

The children may make a picture to go with the number story, but not one that shows the answer. The children who enjoy reading number stories and finding the answers will be able to use the cards in their free time. The teacher may use them with groups of children who need help.



Jack's book has 7 stories in it. He has read 3 of them. How many stories are left for Jack to read?



The children had a pet parade.
One goat pulled the wagon.
Six goats walked after the wagon.
How many goats were in the parade? ____

Mary had 7 kittens in a basket.
Four of the kittens jumped out and ran away.
How many kittens were in the basket then? ____

Ruth had 4 ducks in the parade.
Dick had 3 ducks.
How many ducks were in the parade? ____

There were 5 black puppies in the parade.
There were 5 white puppies.
How many puppies were in the parade? ____

John had 7 hens in a box. Bob had 3 hens
in another box. How many more hens
did John have than Bob? ____

Add or subtract, and write the answers.

1	4	6	4	7	10	4	5	7	4
+ 6	+ 1	− 3	+ 3	− 6	− 5	+ 4	− 2	− 3	+ 2

7	3	7	2	5	5	3	8	6	5
− 1	+ 3	− 4	+ 3	+ 5	− 1	+ 4	− 4	+ 1	− 3

WORKING WITH GROUPS OF SEVEN, ONE, AND EIGHT

Preparatory Activities

Exercises are provided on page 71 to develop a better understanding of the number 8, and to prepare the children for the next group of related addition and subtraction facts. These experiences help them to see the subgroups 7 and 1 in a group of 8.

Using concrete objects. Before they use their books, the children may be given the following, or similar, experiences:

Arrange on a table a group of 7 small books and 1 large book, as 7 readers and 1 picture book. Have the children count the small books. Let them find how many large books there are and how many books there are altogether.

Let the children find how many picture books there are, how many readers, and how many books in all.

Place the readers in a stack. Then ask how many books there are in all, how many are in the stack, and how many are alone.

Set the readers on the chalk ledge and hold the picture book. Have the children tell again how many books there are, how many you are holding, and how many are on the chalk ledge.

Let each child use his counters to build groups of 8 in response to these directions:

Place 7 counters on the desk. Place 1 more counter near them. How many are there in all?

Place 1 counter on the desk. Place 7 counters near it. How many are there in all?

Place 8 counters on the desk. Move 7 to the side. How many were not moved?

Place 8 more counters on the desk. Move 1 of them to the side. How many were not moved?

Using Page 71

Have the children discover that some of the leaves in the pictures are on the ground and some are on the tree. Have them read the questions one at a time, and write the answers in the blanks.

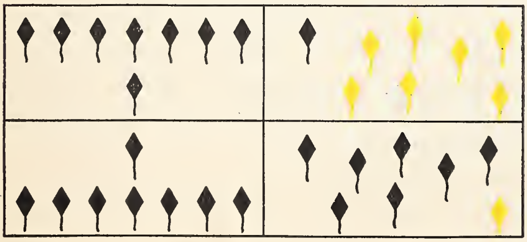
Have the children make pictures of trees, as the directions tell them to do. The trees may be simple line drawings as shown. If the children wish, they may make circles or lines for the trees.

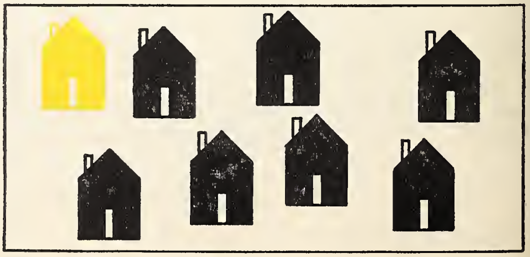
Have the children read the questions at the bottom of the page and write the answers.

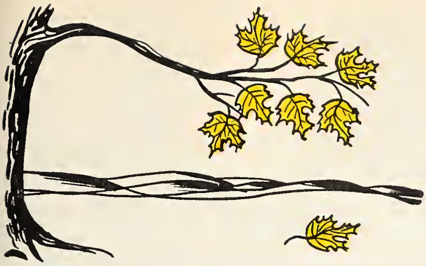
Follow-up Activities

Additional learning helps. If the slower learners had difficulty, they may be given more help with concrete objects. Then they may correct the mistakes in their books. After that, they may make cards such as the following for the groups of 8.

Enrichment activities. The faster learners may wish to read a library book or work on one of their projects. They may want to make pictures of 8 objects. The pictures may show the smaller group of 7 and a single object by the use of color differentiation, as:



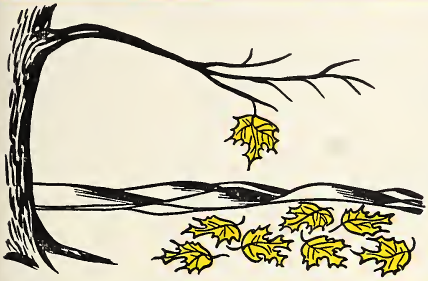




How many leaves are on the tree? ____

How many are on the ground? ____

How many leaves are there? ____



How many leaves are on the tree? ____

How many are on the ground? ____

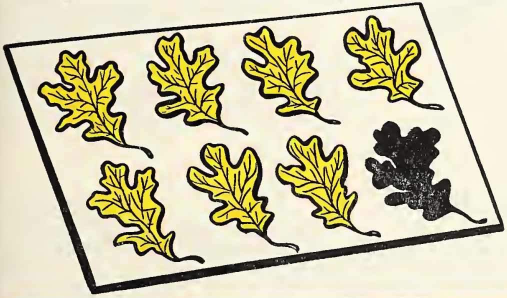
How many leaves are there? ____

Draw 7 trees.

Then draw 1 more tree. ____

Draw 1 tree.

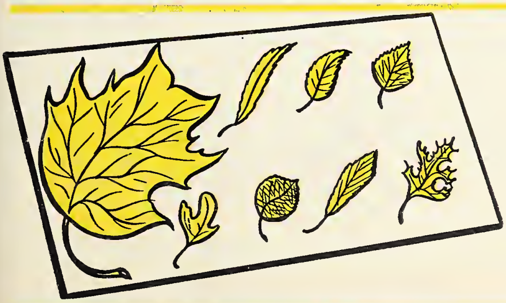
Then draw 7 more trees. ____



How many leaves are there? ____

How many are yellow? ____

How many are not yellow? ____



How many leaves are there? ____

How many are big? ____

How many are little? ____

LEARNING FOUR NEW FACTS

Preparatory Activities

Four new facts, 7 + 1 = 8, 1 + 7 = 8, 8 − 7 = 1, and 8 − 1 = 7, are introduced on page 72 through illustrations for stories to be told orally. The children write the facts after they have stated them from a composite picture.

Before the children do the exercises in their books, they should have the facts developed through dramatization and with concrete objects.

Dramatization. The teacher may tell stories such as those below and have the children dramatize them:

One day there was a circus parade. Seven large elephants and 1 small elephant were in the parade. How many elephants were there?

One short clown and 7 tall clowns were in the parade. How many clowns were in the parade?

Eight monkeys were riding on elephants. Seven of the monkeys jumped off. Then how many monkeys were riding on the elephants?

Eight clowns were walking in the parade. One clown climbed on an elephant. How many clowns were walking then?

Using concrete objects. Have the children build the facts with their counters in response to directions such as these:

Put on your desks 7 counters and 1 more counter. How many are 7 and 1?

Put on your desks 1 counter and 7 more counters. How many are 1 and 7?

Put 8 counters on your desk. Take 7 of them away. How many are left when you take 7 from 8?

Put 8 more counters on your desk. Take 1 of them away. How many are left when you take 1 from 8?

Using Page 72

Tell these stories as the children study the pictures, then have them write the answers for the examples.

John was feeding the pigeons in the park. Seven pigeons were eating. One more pigeon came. How many pigeons were eating then?

Betty was feeding nuts to 1 squirrel. Seven more squirrels came to eat. How many squirrels were eating in all?

Eight pigeons were on the ground. Seven of them flew away. How many pigeons were on the ground then?

Eight squirrels were eating nuts. One of them ran away. How many squirrels were eating then?

Have the children study the composite picture at the foot of the page and state the new facts. Then have them read the directions and write the facts.

Follow-up Activities

Additional learning helps. The children who need more help may tell stories that use the facts, build the facts with concrete objects, and write them. They may make an illustrated study card, as:

Front

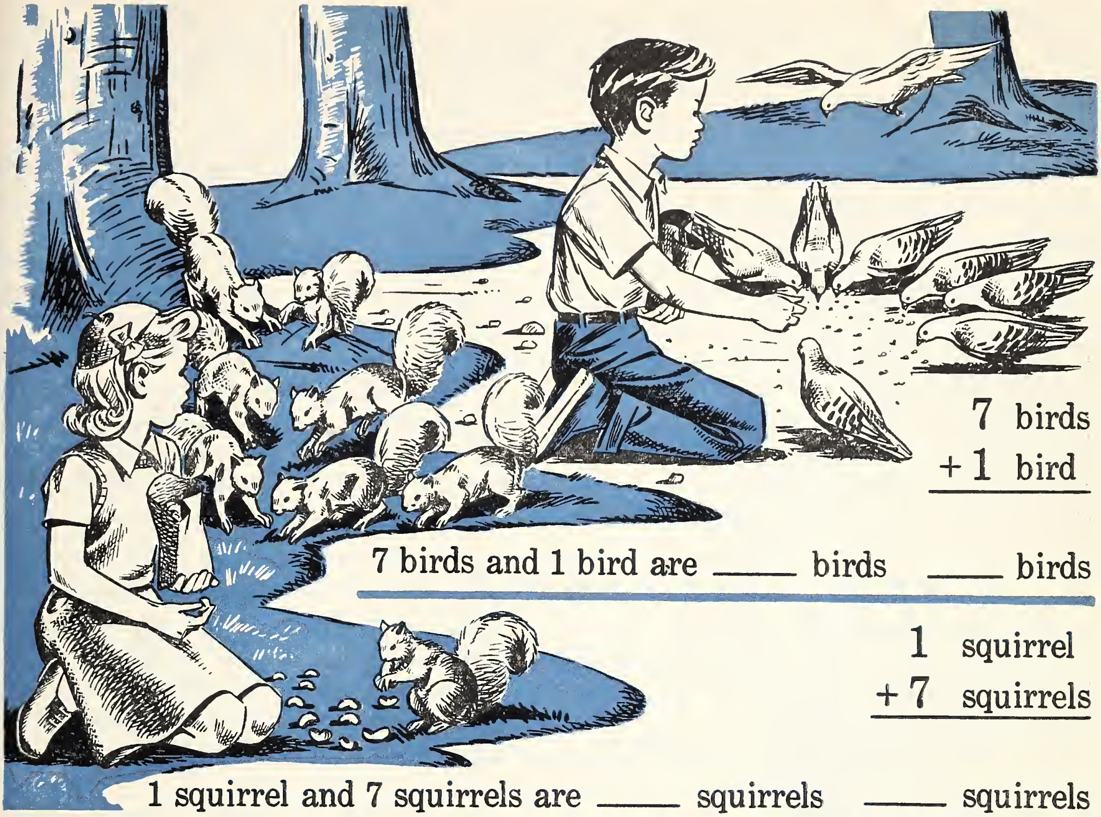
$$\begin{array}{rrrr} 7 & 1 & 8 & 8 \\ \underline{+1} & \underline{+7} & \underline{-7} & \underline{-1} \end{array}$$

Back

$$\begin{array}{rrrr} 7 & 1 & 8 & 8 \\ \underline{+1} & \underline{+7} & \underline{-7} & \underline{-1} \\ 8 & 8 & 1 & 7 \end{array}$$

Enrichment activities. The children who are keeping charts of new facts may add the four new facts to their charts. Then they may make an illustrated card for the group of facts and an individual card for each fact, as shown below:

$$\begin{array}{r} 8 \\ \underline{-1} \\ 7 \end{array}$$



7 birds
+1 bird
____ birds

7 birds and 1 bird are ____ birds

1 squirrel
+7 squirrels
____ squirrels

1 squirrel and 7 squirrels are ____ squirrels

8 birds
−7 birds
____ bird

7 birds from 8 birds is ____ bird

8 squirrels
−1 squirrel
____ squirrels

1 squirrel from 8 squirrels is ____ squirrels

+ ____   + ____   − ____   − ____

Four facts have 7, 1, and 8
in them. Write the four facts.

USING ADDITION AND SUBTRACTION IN NUMBER STORIES AND EXAMPLES

Preparatory Activities

Some of the recently introduced addition and subtraction facts are used in number stories on page 73. Other known facts are used in examples.

Reading number stories. The stories given below may be written on the blackboard, and the children asked to read them silently. If the children need help in interpreting a story, the teacher may ask them to tell in their own words what the story tells and what the question asks. If they need still more help, the teacher may have them draw pictures to illustrate the story. Note that the second story uses the comparison type of subtraction situation.

Jane went to the toy store to see the toys. She saw 7 dolls on one shelf and 1 doll on another. How many dolls did she see?

Jane saw a red doll hat for 8 cents and a blue one for 4 cents. How much less did the blue hat cost?

Jane saw 4 red chairs and 3 white chairs for a doll house. How many chairs did Jane see in all?

Using Page 73

Make sure that the children know all of the words in the number stories in the book. Then have them study the picture to find what the stories are about.

The children should read the stories silently and find the answers. Then they may do the examples below the stories.

Observe the children closely as they work, and give help to individual children if they appear to be having difficulty.

Follow-up Activities

Additional learning helps. If any of the children need help with reading and understanding number stories, the teacher may help them with the stories that caused difficulty. Then they may be given several similar stories to read under the teacher's direction.

Sometimes it helps to have a child read a story aloud and tell what he thinks the answer is. The oral reading often reveals to the teacher the difficulty the child is having. Just saying the words may help the child to understand the problems.

If errors were made in the examples, the children should be given more practice with concrete objects, and with the cards for the facts that they have not learned.

Enrichment activities. If some of the faster learners are working on number story cards, they may continue, making up stories for the four new facts. Included among these should be some that use the comparison type of subtraction, as:

$$\begin{array}{r}5\\-3\\\hline 2\end{array}$$

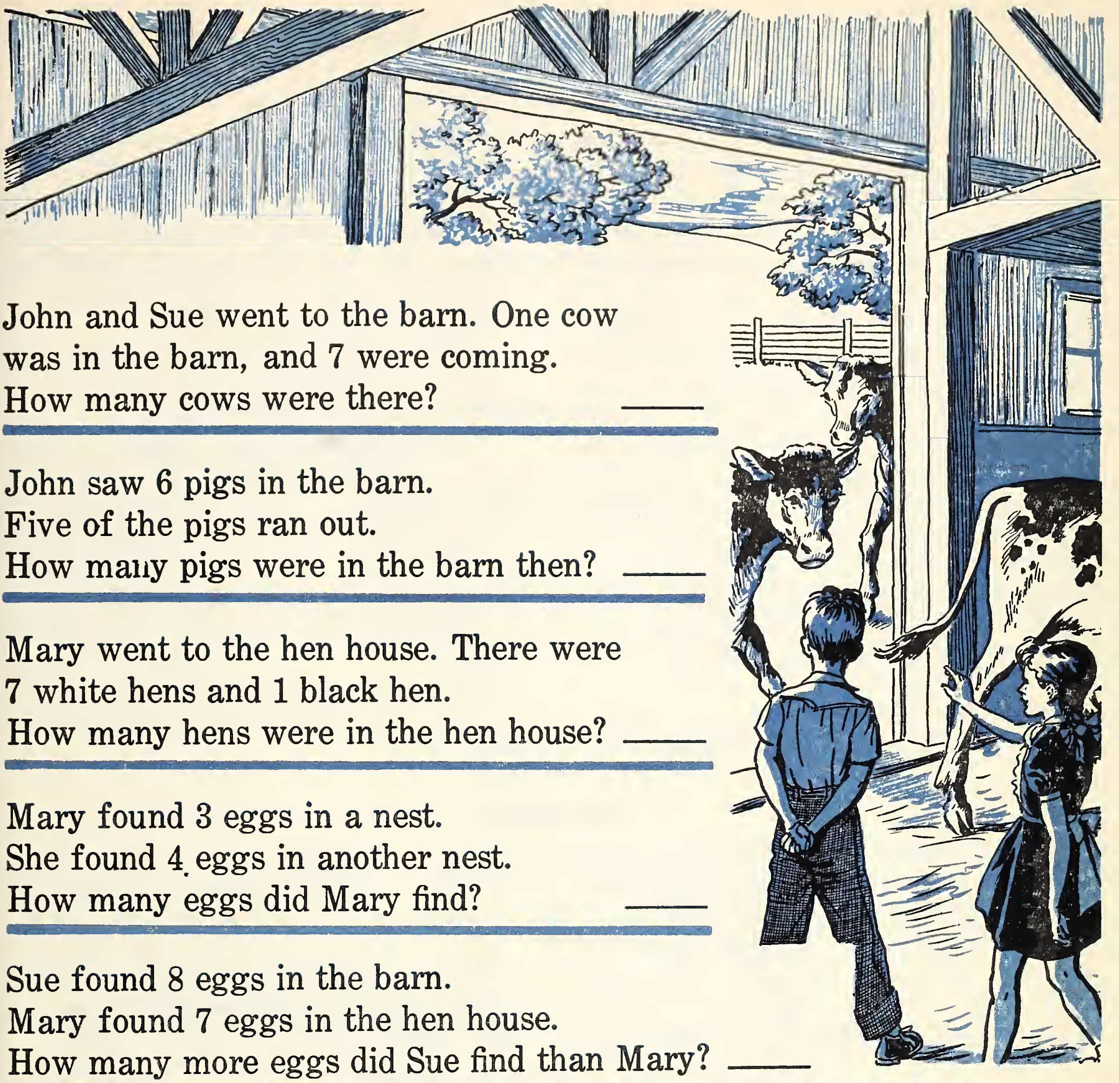
Tom made 5 boats
and John made 3 boats.
How many more boats did
Tom make than John?

Tom's boats
John's boats

$$\begin{array}{r}7¢\\-4¢\\\hline 3¢\end{array}$$

Mary had 7 cents.
Ann had 4 cents.
How much less money did
Ann have than Mary?

Mary's money 1¢ 1¢ 1¢ 1¢ 1¢ 1¢ 1¢
Ann's money 1¢ 1¢ 1¢ 1¢



John and Sue went to the barn. One cow was in the barn, and 7 were coming.
How many cows were there? ______

John saw 6 pigs in the barn.
Five of the pigs ran out.
How many pigs were in the barn then? ______

Mary went to the hen house. There were 7 white hens and 1 black hen.
How many hens were in the hen house? ______

Mary found 3 eggs in a nest.
She found 4 eggs in another nest.
How many eggs did Mary find? ______

Sue found 8 eggs in the barn.
Mary found 7 eggs in the hen house.
How many more eggs did Sue find than Mary? ______

Add or subtract, and write the answers.

$$\begin{array}{r}1\\+4\\\hline\end{array}\quad\begin{array}{r}3\\-1\\\hline\end{array}\quad\begin{array}{r}1\\+6\\\hline\end{array}\quad\begin{array}{r}8\\-7\\\hline\end{array}\quad\begin{array}{r}1\\+1\\\hline\end{array}\quad\begin{array}{r}7\\-1\\\hline\end{array}\quad\begin{array}{r}3\\+4\\\hline\end{array}\quad\begin{array}{r}4\\-1\\\hline\end{array}\quad\begin{array}{r}7\\+1\\\hline\end{array}\quad\begin{array}{r}5\\-4\\\hline\end{array}$$

$$\begin{array}{r}7\\-3\\\hline\end{array}\quad\begin{array}{r}1\\+3\\\hline\end{array}\quad\begin{array}{r}8\\-1\\\hline\end{array}\quad\begin{array}{r}4\\-3\\\hline\end{array}\quad\begin{array}{r}1\\+7\\\hline\end{array}\quad\begin{array}{r}7\\-4\\\hline\end{array}\quad\begin{array}{r}6\\+1\\\hline\end{array}\quad\begin{array}{r}2\\+1\\\hline\end{array}\quad\begin{array}{r}7\\-6\\\hline\end{array}\quad\begin{array}{r}4\\+3\\\hline\end{array}$$

WORKING WITH GROUPS OF FIVE, TWO, AND SEVEN

Preparatory Activities

Experiences with groups of 5, 2, and 7 are provided on page 74. These will extend the children's understanding of the number 7 and prepare them for the introduction of the new learning unit of addition and subtraction facts.

Using concrete objects. The children should use groups of real objects in activities such as the following before they do the exercises on page 74.

Arrange a group of 7 girls around a table. Have 5 of them reading and 2 of them writing. Ask the children to find how many girls are reading, how many are writing, and how many girls there are in the whole group. Then ask the children to look at the group another way to find how many girls are writing, how many are reading, and how many girls there are in all.

Arrange the girls in a group of 7 again. Ask the children to find how many there are. Then ask the girls with books to step to one side. Ask the children how many are in the group at the side and how many are in the other group. Bring the groups together again. Then have the girls with paper and pencils step aside. Let the children identify the groups again as 7, 2, and 5.

Next, have the children discover the groups with their counting objects in response to such directions as these:

Place 5 counters on the desk. Now place 2 more counters near them. How many are there in all?

Place 2 counters on the desk. Place 5 more near them. How many are there in all?

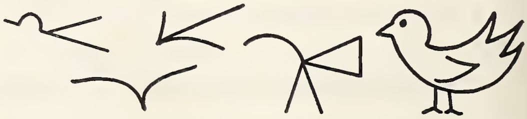
Now place 7 counters on the desk. Move 5 to one side. How many are in the smaller group?

Place 7 counters on the desk again. Move 2 to one side. How many are in the other group?

Using Page 74

Let the children look at the birds in the pictures at the top of the page. Have them read the questions and write the answers.

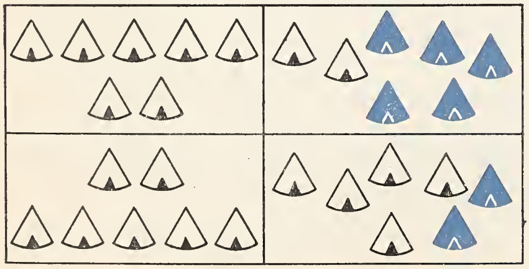
In the next exercise they are to read the directions and draw the birds. They may make simple line drawings, such as those shown, or they may draw lines or circles.



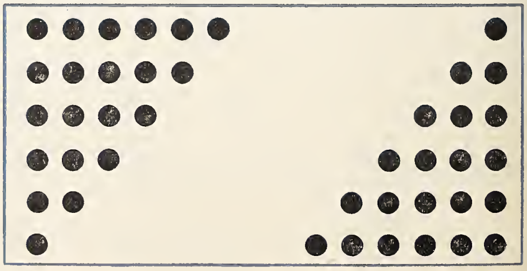
Have the children study the pictures at the bottom of the page, read the questions, and write the answers.

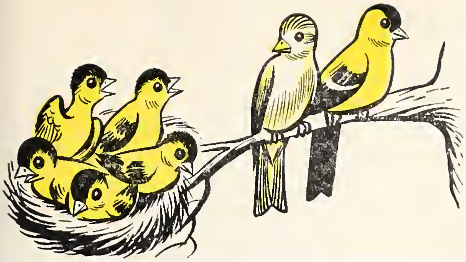
Follow-up Activities

Additional learning helps. Those children who need more work with groups may follow the suggestions again for making groups with concrete objects. Then they may make pictures of the groups, as:



Enrichment activities. The children who do not need help at this time may make cards with pictures showing the new groups for the game table. They may also make charts showing all of the groups of 7.

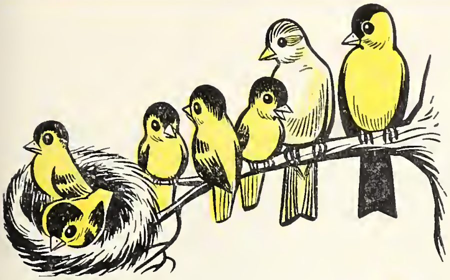




How many birds are in the nest? ____

How many are out of the nest? ____

How many birds are there? ____



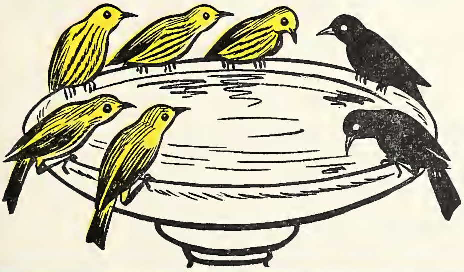
How many birds are in the nest? ____

How many are out of the nest? ____

How many birds are there? ____

Draw 5 birds.
Then draw 2 more birds. ____

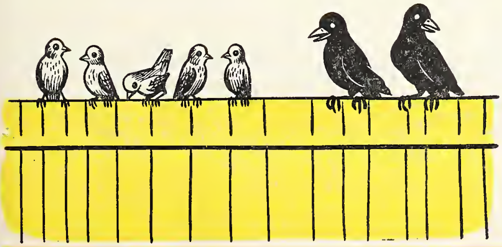
Draw 2 birds.
Then draw 5 more birds. ____



How many birds are there? ____

How many are yellow? ____

How many are black? ____



How many birds are there? ____

How many are big? ____

How many are little? ____

LEARNING FOUR NEW FACTS

Preparatory Activities

On page 75 these four new related addition and subtraction facts are introduced with action pictures which illustrate oral number stories: $5 + 2 = 7$, $2 + 5 = 7$, $7 - 5 = 2$, $7 - 2 = 5$. The children state the facts from a composite picture and write the abstract examples with their answers.

Dramatization. The children should discover the new facts first through dramatization of number stories which use the facts. The following stories may be told:

Some children made a train. The boys made 5 cars for the train. The girls made 2 cars. How many cars did they make in all?

The girls put 2 cars on the track. The boys put 5 cars on the track. How many cars were on the track?

The train went over a bridge. There were 7 cars. Five cars came loose and fell off. How many cars were on the bridge then?

The children fastened the 7 cars together again. Then 2 of the cars came loose. How many cars were in the train then?

Using concrete objects. After the facts are written on the blackboard, the children may build them with counters in response to these directions:

Put 5 counters on the desk. Put 2 more counters near them. Put the groups together. How many are 5 and 2?

Put 2 counters on the desk. Put 5 more counters near them. Put the groups together. How many are 2 and 5?

Put 7 counters on the desk. Take 5 of them away. How many are left when you take 5 from 7?

Put 7 counters on the desks again. Take 2 of them away. How many are left when you take 2 from 7?

Using Page 75

Discuss the pictures of children and pets in the pet store. Then tell these stories as the children study the pictures and write the answers for the examples.

One day 5 children were looking at the pets in the store window. Two more children came. How many children were looking at the pets then?

The children saw 2 puppies in one part of a window and 5 in another part. How many puppies were in the window?

The children saw 7 kittens in a cage. Five of the kittens got out of the cage and walked away. How many kittens were in the cage then?

The children saw 7 fish in an aquarium. A man took 2 of the fish out. How many fish were in the aquarium then?

Have the children study the composite picture and write the facts. The facts may be written in the order in which they were introduced.

Follow-up Activities

Additional learning helps. The slower learners may build the facts with counters, write the facts, and make cards for them, as:

Front

$$\begin{array}{rrrr} 5 & 2 & 7 & 7 \\ +2 & +5 & -5 & -2 \\ \hline \end{array}$$

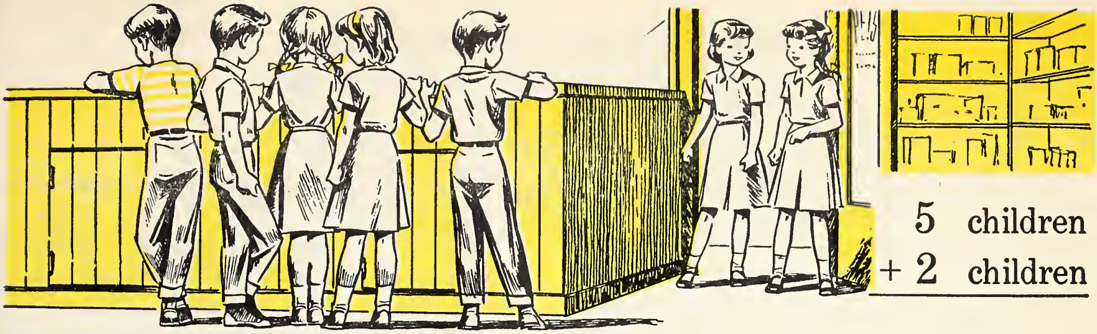
Back

$$\begin{array}{rrrr} 5 & 2 & 7 & 7 \\ +2 & +5 & -5 & -2 \\ \hline 7 & 7 & 2 & 5 \end{array}$$

Enrichment activities. Since all of the facts having sums and minuends of 7 have been introduced, the children may try to recall them and write them. The facts are:

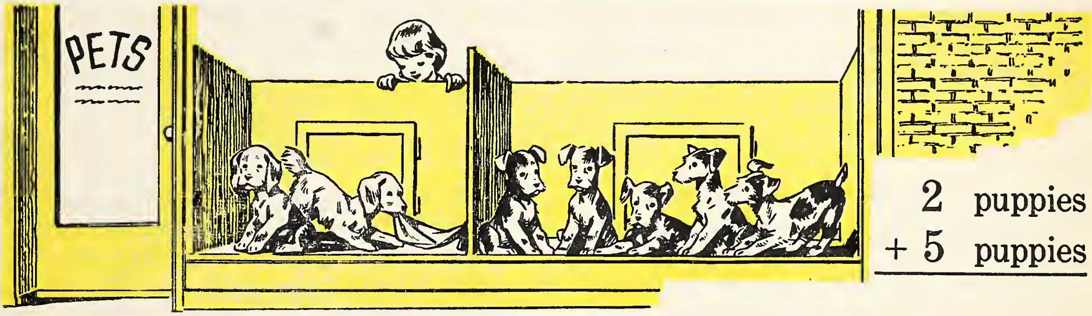
$$\begin{array}{rrrrrr} 6 & 5 & 4 & 3 & 2 & 1 \\ +1 & +2 & +3 & +4 & +5 & +6 \\ \hline 7 & 7 & 7 & 7 & 7 & 7 \end{array}$$

$$\begin{array}{rrrrrr} 7 & 7 & 7 & 7 & 7 & 7 \\ -6 & -5 & -4 & -3 & -2 & -1 \\ \hline 1 & 2 & 3 & 4 & 5 & 6 \end{array}$$



5 children
+ 2 children
___ children

5 children and 2 children are ___ children

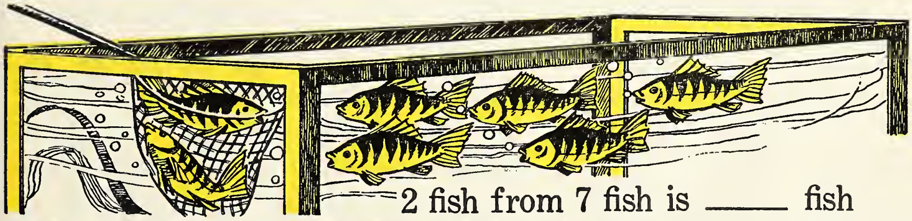


2 puppies
+ 5 puppies
___ puppies

2 puppies and 5 puppies are ___ puppies

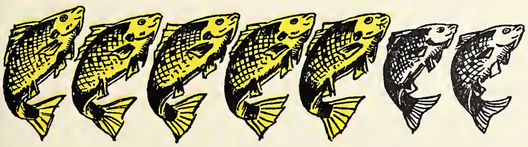
7 kittens
− 5 kittens
___ kittens

5 kittens from 7 kittens is ___ kittens



7 fish
− 2 fish
___ fish

2 fish from 7 fish is ___ fish



+ ___ + ___ − ___ − ___

Four facts have 5, 2, and 7
in them. Write the four facts.

USING ADDITION AND SUBTRACTION IN NUMBER STORIES AND EXAMPLES

Preparatory Activities

On page 76 another group of number stories and a set of examples are provided to give practice in using some of the new facts as well as some introduced earlier.

Reading number stories. Before the children use page 76, the teacher will wish to work with them as they read a few number stories from the blackboard. They should be told that sometimes something happens in a story which helps them know how to find the answer to the question. They should be asked to tell what happened in each story before they find the answer.

Eight boys were making a boat. Seven of the boys went to play ball. How many boys were making the boat then?

One girl was washing doll clothes. Six more girls came to help. How many girls were washing doll clothes then?

Seven dolls were riding in a wagon. The wagon hit a bump and 2 dolls fell out. How many dolls were riding then?

Using Page 76

Discuss with the children the picture of the circus parade. Suggest that in some stories something happens that will help them decide how to find the answer. In others it will help to think what the story tells and what the question asks.

The children should be able to read the direction line above the examples and do what it tells them without assistance.

The teacher should observe the children as they do the work alone, so she can give help to individuals as they need it.

Follow-up Activities

Additional learning helps. The children who had difficulty should be helped to correct the mistakes in their books. Those who had trouble reading the number stories should be given more practice in reading and interpreting similar stories.

Those children who missed addition and subtraction facts should use the study cards to help them learn the correct answers. Then they should practise writing the facts. They may be asked to study those facts again before the next practice exercise is given.

Enrichment activities. Those children who had no difficulty with page 76 may work with the sets of study and practice cards on the game table, reading the addition and subtraction examples, and saying the answers.

$$\begin{array}{r}5\\+2\\\hline\end{array}\qquad\begin{array}{r}2\\+5\\\hline\end{array}\qquad\begin{array}{r}7\\-5\\\hline\end{array}\qquad\begin{array}{r}7\\-2\\\hline\end{array}$$

They may write stories that use the new facts, as:

$$\begin{array}{r}5\text{ cookies}\\+2\text{ cookies}\\\hline 7\text{ cookies}\end{array}$$

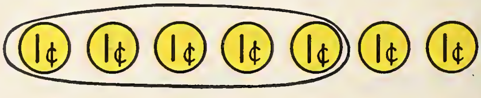
Jane made 5 cookies.
Alice made 2 cookies.
How many cookies did the girls make?

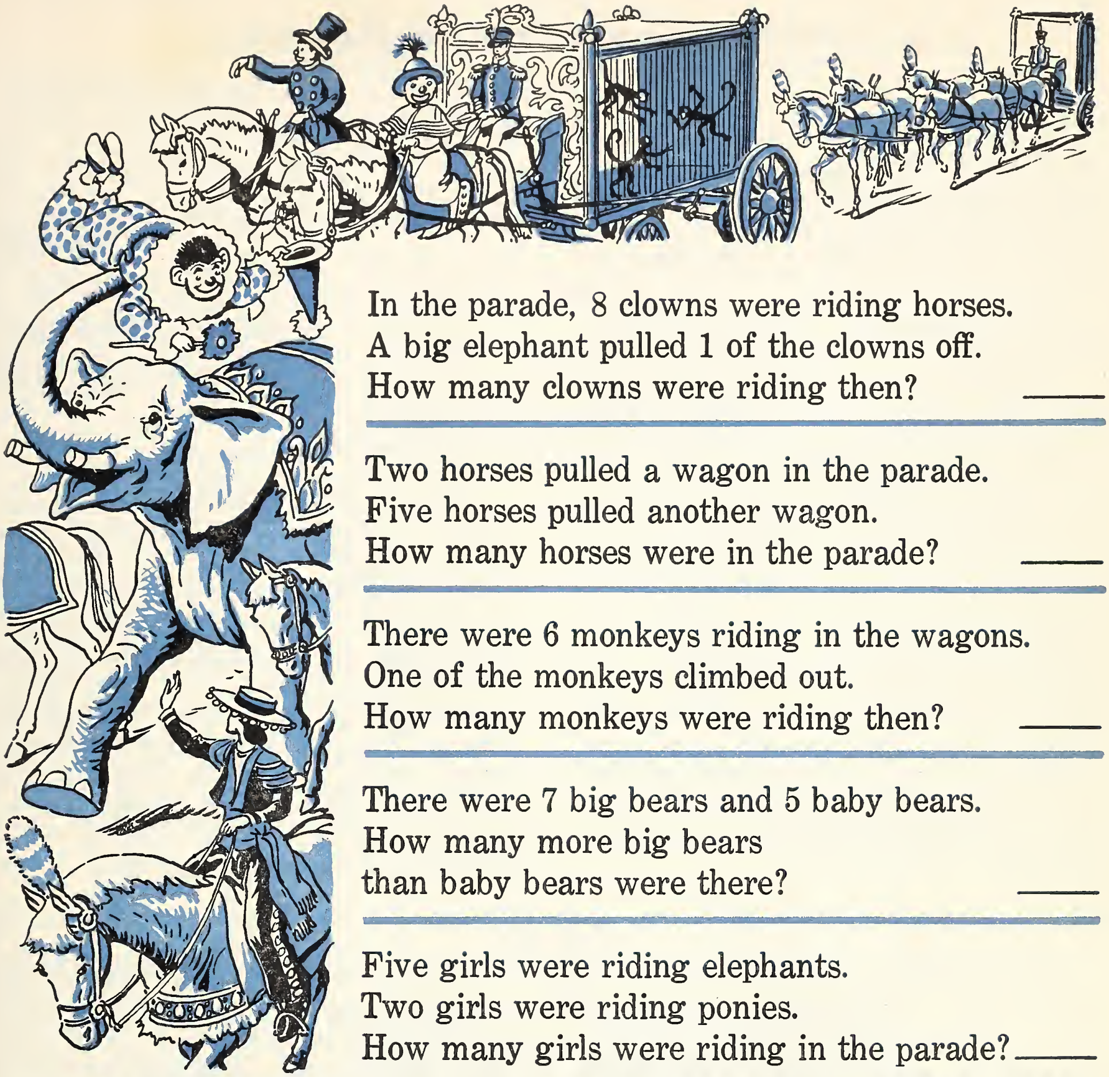
Jane's cookies

Alice's cookies

$$\begin{array}{r}7¢\\-5¢\\\hline 2¢\end{array}$$

Bill had 7 cents.
He spent 5 cents for candy.
How much money did he have left?





In the parade, 8 clowns were riding horses.
A big elephant pulled 1 of the clowns off.
How many clowns were riding then? ____

Two horses pulled a wagon in the parade.
Five horses pulled another wagon.
How many horses were in the parade? ____

There were 6 monkeys riding in the wagons.
One of the monkeys climbed out.
How many monkeys were riding then? ____

There were 7 big bears and 5 baby bears.
How many more big bears
than baby bears were there? ____

Five girls were riding elephants.
Two girls were riding ponies.
How many girls were riding in the parade? ____

Add or subtract, and write the answers.

3	1	7	4	1	2	8	3	3	7
+ 1	+ 7	− 4	− 2	+ 2	+ 5	− 1	− 2	+ 4	− 2

3	2	7	6	2	7	4	8	5	7
+ 2	− 1	+ 1	− 2	+ 2	− 5	+ 3	− 7	+ 2	− 3

LEARNING ABOUT THE FRACTION *ONE-FOURTH*

Preparatory Activities

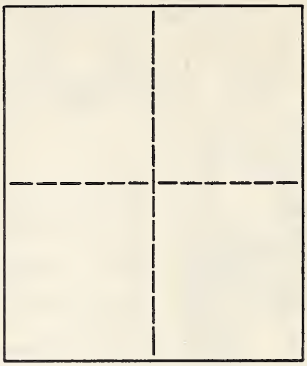
The fraction *one-half* is reviewed and the fraction *one-fourth* introduced on page 77. The words *halves* and *fourths* are introduced as part of the children's arithmetic vocabulary. Exercises for the development of these concepts are provided.

Classroom activities. These activities may be used to introduce the fractions:

Suggest that each child make four greeting cards. These may be birthday cards or cards to be sent on the next holiday.

Give each child a sheet of paper. Have the children fold their papers in half the short way. Point out, or get them to contribute, the fact that each part is one-half of the paper because the parts are equal and there are two parts.

Have them fold the paper again. Ask, after they unfold it, how many parts there are and if each part is the same size as the others. Then tell them that each part is one-fourth of the paper. Have them count the fourths, and then cut the paper along the folds, making four "cards" which they may decorate.



Ask the children to name things that are cut into or divided into fourths, such as a pound of butter.

Have on hand a paper pie plate that is cut into fourths. Give each of the children a circle cut from paper, and let them practise folding it into fourths. Let them fold a string and cut it into fourths. These experiences will help the children understand that the size and shape of the thing cut into fourths is not important. It is important that each piece be the same size as every other piece and that there be four pieces.

Using Page 77

Tell the children that one day Mother made a cake. She cut it first as shown in the top picture. Have them answer the questions, writing the response for the first one and circling *Yes* or *No* for the others.

Then tell them that she cut the cake again as shown in the next picture. Have them answer the questions as above.

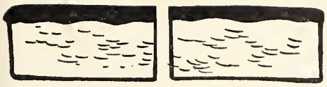
In the next exercise, the children are to read and carry out the directions.

Have the children name the things in the last picture. Help them identify the word *halves*. Have them trace the line to the pie that is cut into halves. Then help them identify the word *fourths*, and have them trace the line to the pie that is cut into fourths. Now the children should draw lines from the word *halves* to each thing that is cut into halves and from the word *fourths* to each thing that is cut into fourths.

Follow-up Activities

Additional learning helps. If some children had difficulty understanding the fraction *one-fourth*, they may be given more experience in dividing things into fourths. Then they may be given pictures of things which are cut into fourths and halves, and into two and four unequal parts. They may identify the halves and fourths. Then they may correct the mistakes in their books.

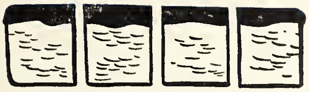
Enrichment activities. The children who do not need help may be given squares and circles of colored paper to cut into halves and fourths and paste on paper to make charts for the game table.



How many pieces? ____

Is each piece as big as the other? Yes No

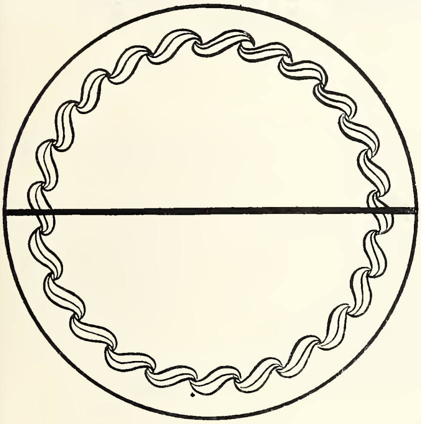
Is each piece one-half of the cake? Yes No



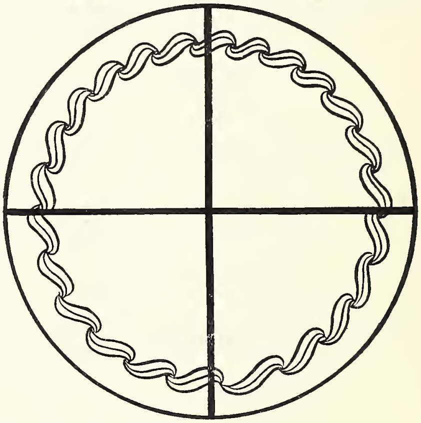
How many pieces now? ____

Is each piece as big as the others? Yes No

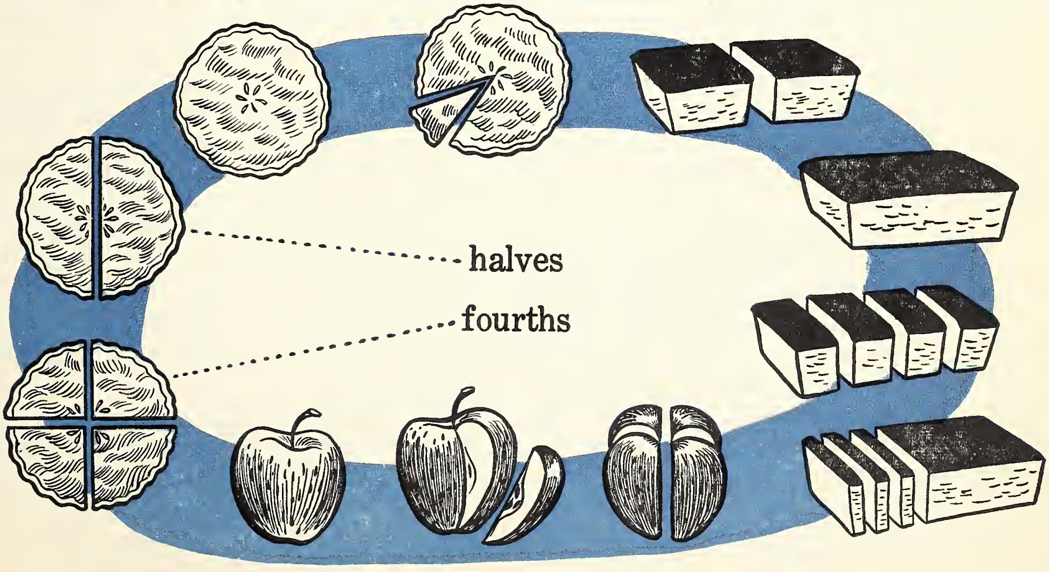
Each piece is one-fourth of the cake.



Color one-half blue.



Color one-fourth green.



USING QUARTS, PINTS, HALF PINTS, AND GLASSES; USING FACTS IN NUMBER STORIES ABOUT MONEY

Preparatory Activities

On this page the children will practise using pints, quarts, half pints, and glasses. Then they will be given practice with number stories about money. The subtraction concepts of how much more and how much less are used in the stories also.

Using measures. The teacher will wish to use the quart, pint, half pint, and glass measures again to redevelop and review the table of measures. Then the children may talk about how much milk they drink each day.

Subtraction concepts. The children may review the word *cent* and the cent sign. Then the concept of finding how much more and how much less one amount of money is than another may be reviewed, first by comparing actual pennies and then by subtracting. These questions may be answered:

How much more money is 8¢ than 4¢? 7¢ than 3¢? 10¢ than 5¢?, etc.

How much less money is 6¢ than 7¢? 1¢ than 8¢? 5¢ than 7¢?, etc.

Using Page 78

Call attention to the picture at the top of the page. Tell the children that they will find out from the questions and the pictures how much milk the boys and girls drink. Have them read the questions and write the answers. If they have difficulty, use the containers that are available in the classroom to find the answers. If the teacher wishes, she may have the children prove by measuring that their answers are right.

Have the children name the toys in the picture and tell how much each one costs. Explain that this is a play store and that boys and girls have made the toys. Then have the children read and follow the directions, and write the answers.

Follow-up Activities

Additional learning helps. If some children had difficulty with the questions about measures, it will be well to help them work out the answers to the questions on page 78, using actual containers. Perhaps it will help these children to see the relationships if the containers themselves are used to illustrate the table of measures. For example, write on the blackboard:

1 quart is as much as 2 pints

To illustrate this statement, set a quart container and 2 pint containers side by side.

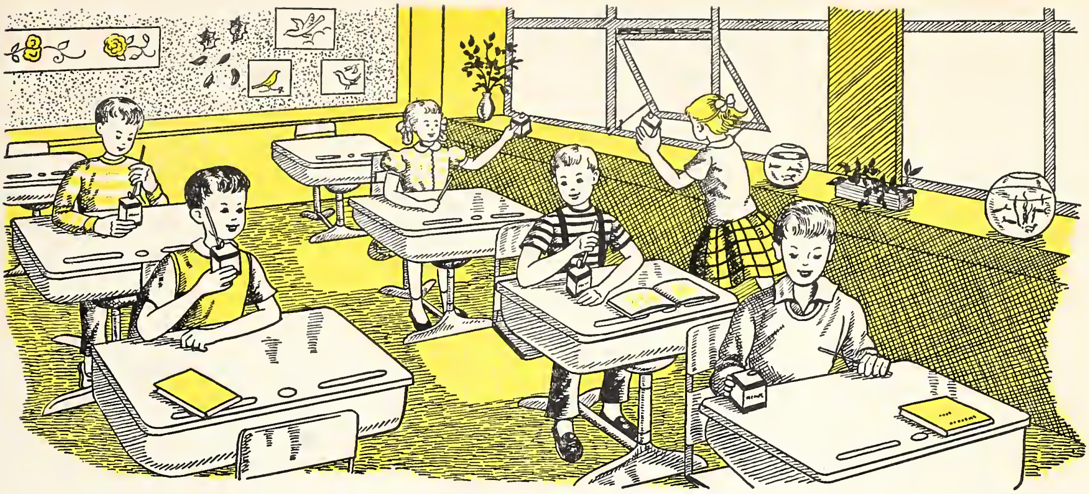
Follow the same procedure with a pint and 2 half pints, a half pint and a glass.

If some children were unable to follow the directions in the exercise about playing store, it will be helpful to make pictures of toys on the blackboard and put a price beside each picture. Then give oral directions similar to those in the book. Help the children respond to those oral directions until they can follow them. Then write a few directions on the blackboard for them to read and follow.

With this help, the children should be able to correct the mistakes they made in their books. They may use pennies or make pictures of the pennies if they need to do so to make sure their answers are correct.

If the facts caused the difficulty, each child should use the study cards to learn the facts he missed. When the child is sure of the facts that were difficult for him, he may write them three or four times.

Enrichment activities. The children who do not need help may find other things to do. Some may wish to play store at the game table. Some may wish to write number stories about buying toys. For both of these activities, the children should use the list of addition and subtraction facts already learned as a guide in selecting amounts of money for the store activity and the stories.

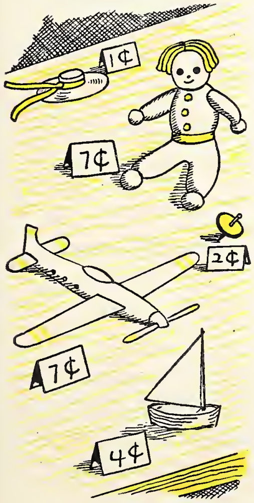


Bob has 2 glasses of milk each morning.
How many pints does he have? ____

Mary has 1 half pint of milk at school.
How many glasses of milk is this? ____

Dick has 2 half pints of milk at school.
How many pints of milk is this? ____

John has 1 quart of milk each day.
How many pints of milk is this? ____



Play that you are buying toys at the store.
Buy a doll hat for 1 cent. Buy a doll
for 7 cents. How much will you pay? ____

Buy an airplane for 7 cents. Buy a top
for 2 cents. How much more did you pay
for the airplane than for the top? ____

Buy a doll for 7 cents. Buy a boat
for 4 cents. How much less did you pay
for the boat than for the doll? ____

Did you put ¢ after the answers?

MAINTAINING UNDERSTANDING OF MONEY; MAKING SURE OF THE TWENTY NEW FACTS

Preparatory Activities

Maintenance for the value of the nickel, the dime, the quarter, the half dollar, and the dollar is provided on page 79. The ten addition facts and the ten subtraction facts most recently introduced are tested. The children should be able to do the exercises on this page without preparation, since they are similar to preceding exercises.

Using Page 79

Call attention to the pictures of money and tell the children to read the words above each picture and then fill the blanks. They may do the first one together orally. Then the others should be done independently. The teacher may give help if needed.

The children may read the directions above the examples, and follow them. It is advisable to have the children omit the examples for which they do not know the answers rather than guess at the answers or count to find them. They should be told that they will have a chance to learn the facts later if they do not know them now.

Follow-up Activities

Additional learning helps. The teacher will wish to find which specific facts need attention. A chart like this may be made:

1 +1	1 +2	1 +3	1 +4	1 +5	1 +6	1 +7	1 +8	1 +9	10 − 9
2 +1	2 +2	2 +3	2 +4	2 +5	2 +6	2 +7	2 +8	9 −8	10 − 8
3 +1	3 +2	3 +3	3 +4	3 +5	3 +6	3 +7	8 −7	9 −7	10 − 7
4 +1	4 +2	4 +3	4 +4	4 +5	4 +6	7 −6	8 −6	9 −6	10 − 6
5 +1	5 +2	5 +3	5 +4	5 +5	6 −5	7 −5	8 −5	9 −5	10 − 5
6 +1	6 +2	6 +3	6 +4	5 −4	6 −4	7 −4	8 −4	9 −4	10 − 4
7 +1	7 +2	7 +3	4 −3	5 −3	6 −3	7 −3	8 −3	9 −3	10 − 3
8 +1	8 +2	3 −2	4 −2	5 −2	6 −2	7 −2	8 −2	9 −2	10 − 2
9 +1	2 −1	3 −1	4 −1	5 −1	6 −1	7 −1	8 −1	9 −1	10 − 1

On the chart the teacher may tabulate mistakes by making a tally mark beside each fact each time it is missed. This will show how many children missed each fact and therefore will reveal the facts that most need reteaching.

The teacher will also need a card or a folder for each child. On this record the teacher will list the specific facts the child missed and the date. When the child finally shows that he has learned the fact, a check or O.K. will be recorded, again with the date. Other comments about his work will be recorded also.

John Smith

2/7	5 +2	8 −1

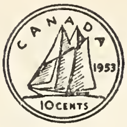
John can get these facts if he uses counters.

After the records are made, the teacher will plan to work with those children who need help. She will want to retrace with each child the learning steps that apply to the facts he has not mastered.

A nickel is as much money as

______ cents

A dime is as much money as



______ cents

or ______ nickels

A quarter is as much money as

______ cents

or ______ nickels

A half dollar is as much money as

______ cents

or ______ dimes

or ______ quarters

One dollar is as much money as

______ cents

or ______ dimes

or ______ quarters

or ______ half dollars

Add or subtract, and write the answers.

4	7	1	7	4	10	6	8	2	7
+ 3	− 5	+ 7	− 6	+ 4	− 5	+ 1	− 7	+ 5	− 1

1	8	5	7	5	8	3	7	7	7
+ 6	− 1	+ 2	− 4	+ 5	− 4	+ 4	− 2	+ 1	− 3

LEARNING HOW TO DO COLUMN ADDITION

Since simple addition and subtraction are now quite well understood by the pupils, they are ready to learn to add a column of three one-place numbers. Column addition is introduced at this time because the children have a need for it in their out-of-school experiences. Furthermore, it provides a situation in which known facts are applied in a new way, adding variety and significance to the practice materials.

The addition of three numbers is a challenging experience for children in Grade Two because they add a seen number to an unseen number. For example, in adding 2 and 4 and 1, they think "2 and 4 are 6." They do not see the 6. But they must add 1 to the 6 which they have thought but have not seen. When this new step is understood, the process causes no particular difficulty.

However, pupils who find simple addition difficult may well be excused from the work with column addition, since this process will be retaught in Grade Three.

Column addition should be introduced in realistic situations which demonstrate the way we use it and which illustrate its meaning and develop understanding. Then the children should use concrete objects to discover the technique of combining more than two groups. They should proceed gradually to the addition of abstract numbers and to the use of column addition in number stories.

While they are working with concrete objects, the pupils probably will count to find how many there are as the smaller groups are combined. However, some of the pupils may add. For example, in this situation, some pupils may see the 2 blocks and 4 blocks, and think "6 blocks." Then they may see 1 more block and think, "7 blocks." Other pupils may see the blocks and count, "one, two, three, four, five, six." Then they may count the 1 block, "seven." Either response is acceptable in the beginning stage of column addition.

However, it is the former response the teacher will be striving to get. Therefore care must be taken to plan the column addition examples in such a way that only known addition facts are involved. This will encourage the pupils to add instead of count. For example, the fact $6 + 3 = 9$ has not been learned at this time. So the column addition example $3 + 3 + 3$ cannot be used until after that fact is introduced.

Since all of the facts with sums of 3, 4, 5, 6, and 7 have been learned, all of the possible columns of three numbers with sums of 3, 4, 5, 6, or 7 may be used in column addition examples. They are:

1	1	1	2	1	1	3	1	1
1	1	2	1	1	3	1	1	4
1	2	1	1	3	1	1	4	1
4	1	1	5	1	2	2	1	3
1	1	5	1	2	1	2	3	1
1	5	1	1	2	2	1	3	3
3	1	1	2	2	3	3	1	1
3	2	3	1	3	1	2	2	4
1	3	2	3	1	2	1	4	2
2	2	4	4	2	2	2	3	
1	4	1	2	2	2	3	2	
4	1	2	1	2	3	2	2	

Since the only facts with sums of 8 that have been learned are $4 + 4 = 8$, $7 + 1 = 8$, and $1 + 7 = 8$, these are the only column addition examples with sums of 8 that can be used at this time:

1	3	2	1	6	2	5	3	4
3	1	2	6	1	5	2	4	3
4	4	4	1	1	1	1	1	1

None of the facts with sums of 9 have been learned up to this time. Therefore we cannot use column addition examples with sums of 9 until after those facts are introduced.

However, these column addition examples with sums of 10 can be used:

1	4	2	3
4	1	3	2
5	5	5	5

In reading, children begin at the top and read down the page. They begin at the top to add in simple addition examples. Therefore it seems logical to begin at the top and add down in column addition. A decision about the direction in which addition would occur had to be made before the examples were planned so that the pupils would not need to use facts they had not yet learned. All of the examples in this book were planned for downward addition. They must be used in that way.

It is well to make a list of the columns which may be used at this time, and check them after they are used in additional practice exercises and number stories. In this way the practice is properly distributed over the entire list of possible columns. Good distribution of practice can be maintained if the teacher makes a record of the examples and uses different ones each time.

The list of examples below includes those that can be used after the six new units of addition and subtraction facts are introduced in this section of the pupil's book. The list includes the pages of the pupil's book *after which* the examples may be used.

After page 83

1	7	4
7	1	4
1	1	1

After page 86

1	1	5	2	4	3	2	6
1	5	1	4	2	3	6	2
6	2	2	2	2	2	1	1

After page 90

1	2	1	4	2	3	3	5
2	1	4	1	3	2	5	3
5	5	3	3	3	3	1	1

After page 96

1	8
8	1
1	1

After page 99

1	1	6	2	5	3	4	2	7
1	6	1	5	2	4	3	7	2
7	2	2	2	2	2	2	1	1

After page 102

1	2	1	5	2	4	3	3	6
2	1	5	1	4	2	3	6	3
6	6	3	3	3	3	3	1	1

In the next section of the pupil's book, four more learning units of addition and subtraction facts will be introduced. At that time 33 more column addition examples will become available for use. Those examples will be listed for the teacher later. They complete the list of 120 different practice examples, which are all that are possible when three numbers with sums of 10 or less are added.

This section of the pupil's book will include a further development of the subtraction process also. The concept of "how many more" will be extended to include the comparison of two groups of different things. For example, "How many more cars are there than wagons?"

The concept of subtraction which answers the questions "How many more are needed?" and "How much more is needed?" will be developed also. This is probably the most difficult of the steps in the subtraction process because the child must visualize the minuend. There is no way to illustrate it for him. In finding how many are left, the child can be shown something concrete which represents the minuend. He may then find how many are left by taking the specified number away. In finding how many or how much more one quantity is than another, both quantities can be illustrated and the child can compare them. But to find how many or how much more is needed, he can only be given a clue. For example, if he needs 8 nails to make something, and has 5 nails, he can be helped to visualize the group of 8 by being shown where the nails belong in the thing he is building. He really needs to think, "5 and how many make 8?" instead of "5 from 8 is how many?" In other words, he does not have the 8 to begin with. He will need help from realistic situations to develop an understanding of this step of the subtraction process.

Also in this section of the pupil's book, the reading of numbers to 200 and counting by twos will be introduced, and the meaning of numbers to 100 will be maintained. Maintenance exercises on telling time, measuring by the inch, foot, and yard, and the fractions one-half and one-fourth will be provided as well.

The fifth of the "Making Sure" tests will come in this section of the book also.

ADDING MORE THAN TWO NUMBERS

Preparatory Activities

Column addition is introduced on page 80. Two illustrated number stories and models of the examples which grow out of them are provided. The models include statements of the addition procedure to guide the children as they work. Then examples are provided which enable the children to practise using the newly learned techniques.

Dramatization. In column addition the children add two numbers, keep the sum in mind without writing or seeing it, and add another number to it. This step can best be learned by the children through the dramatization of realistic number stories and demonstrations with concrete objects.

Tell a number story and let the children dramatize it. As you tell the story, hesitate long enough between sentences to allow for the action to take place and for the children to see what happens. The following story is suggested:

Two girls were reading at the reading table. One more girl came to read. Soon 4 more girls came. How many girls were reading in all?

Write the example as the children retell the story. Then say, and demonstrate by showing the action, "2 girls and 1 girl are 3 girls. We remember the 3. Then we add 4 more girls. Three girls and 4 girls are 7 girls."

2 girls
1 girl
4 girls
7 girls

Use the following story in the same way, writing the example on the blackboard as the story is dramatized:

There were 3 books on the table. John put 4 more books on the table. Then Sue put 1 more book on the table. How many books were on the table then?

Then say, "3 books and 4 books are 7 books, and 1 more book makes 8. We write the 8 under the line."

Using concrete objects. Now lay on the table 3 pencils, 2 pencils, and 5 pencils. Demonstrate with the pencils as you say, "3 pencils and 2 pencils are 5 pencils, and 5 more are 10 pencils."

Have several children use pencils or counters to repeat the above procedure with these examples:

4 + 1 + 2   1 + 1 + 4   1 + 3 + 3
2 + 5 + 1   5 + 1 + 1   1 + 4 + 5

Using Page 80

Discuss the pictures. Then have the children read the stories. Explain how the numbers in the examples came from the stories. Then have the children read the lines beside the models, trace the numbers, and write the answers.

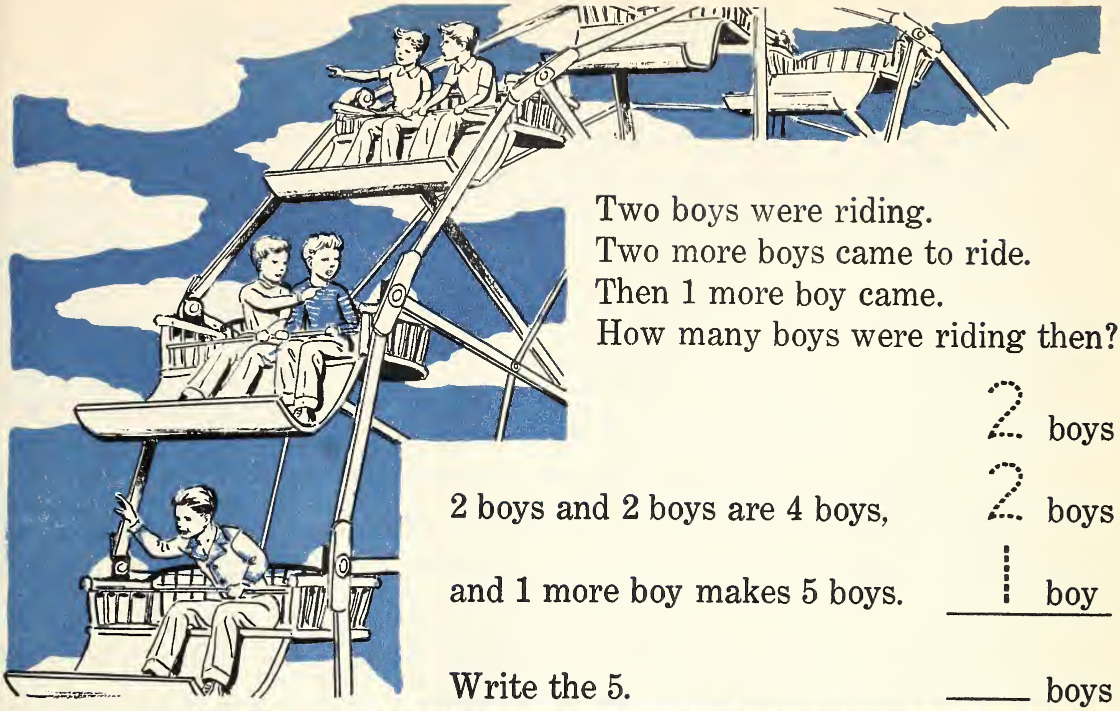
Explain the direction line above the examples. Have several children add orally to get the easy progression down the column —"4 and 1 are 5, and 2 are 7"; "1 and 2 are 3, and 3 are 6," etc. Then let them add, and write the answers.

Follow-up Activities

Additional learning helps. If any children had difficulty, they may be given other stories to dramatize. Care should be taken in the dramatization to have the children see the first two groups combined and think how many there are before the third group is combined with the others.

Have the children use counters for several examples, adding orally. Encourage them to add instead of count. Then give them several examples and have them add orally without counters. They may do the examples in their books again if they made mistakes.

Enrichment activities. This is an excellent time for the children who do not need help to find pictures in magazines to illustrate column addition stories. They may enjoy writing and illustrating column addition stories of their own.



Two boys were riding.
Two more boys came to ride.
Then 1 more boy came.
How many boys were riding then?

2 boys

2 boys and 2 boys are 4 boys, 2 boys

and 1 more boy makes 5 boys. 1 boy

Write the 5. ____ boys

One girl was riding.
One more girl came to ride.
Then 3 more girls came.
How many girls were riding in all?

1

1 and 1 are 2, 1

and 3 more makes 5. 3

Write the 5.

Begin at the top and add down.

4	1	5	2	1	3	1	1	2	2
1	2	2	3	1	2	2	3	4	1
2	3	1	1	4	5	4	4	1	3

USING COLUMN ADDITION IN STORIES AND EXAMPLES

Preparatory Activities

Up to this time it has not been necessary for the children to write the numbers in the number stories as examples. The stories have involved only a simple and familiar addition or subtraction fact. But now the children are to learn to read number stories involving column addition and write the example before they add. Page 81 provides material for this purpose and also examples in column addition.

Writing examples from stories. Two or three column addition number stories that involve known facts may be written on the blackboard. The children may read them orally. Then the teacher may explain that the numbers from the story should be written in a column before they are added. The children may write the numbers and find the answer. They should be reminded to begin at the top to add, and told to write the numbers in the order in which they come in the story. The following number stories are suggested:

The children brought pets to school. Mary brought 3 turtles, Tom brought 1 bird, and Fred brought 3 rabbits. How many pets did the children bring?

The girls brought flowers to school. They brought 2 red flowers, 2 blue flowers, and 2 yellow flowers. How many flowers did the girls bring in all?

The boys brought 2 motorboats, 3 sailboats, and 5 rowboats to school. How many boats did the boys bring?

Doing examples orally. It may be helpful also to provide a few practice examples to be used before those in the book are used. They may be selected from the list provided earlier. A careful check should be made of those used so that each possible column addition example is used about as often as the others.

The examples may be written on the blackboard and the children asked to do them orally. Thus they demonstrate again the addition procedure to be used.

Using Page 81

The children may read the first story together and trace the numbers with the teacher directing and helping as help is needed.

They may read the other stories and answer the questions independently. Then they may read the direction line and find the answers for the examples.

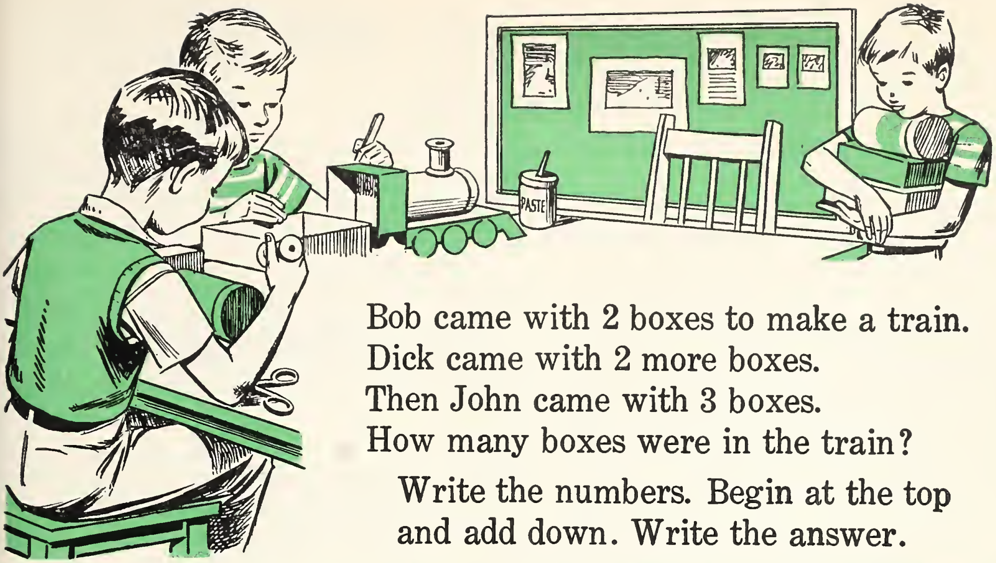
Follow-up Activities

Additional learning helps. It is quite likely that some of the slower learners will continue to need help with column addition. This help should be based upon their specific needs. If some children fail to understand the process, the teacher should repeat the techniques of dramatizing stories, demonstrating the process through the use of concrete objects, and finally guiding the children in oral addition of three numbers.

If some children need help in reading and interpreting number stories, vocabulary development activities and guided reading of the stories may be provided. Dramatizing the stories and making illustrations for them will help clarify them. Helping the children retell the stories after they have read them may help also.

If the chief cause of the difficulty is the addition facts, the examples missed may be analyzed to find which facts need attention. Having the child add orally as the teacher listens will reveal the mistakes he is making. For instance, in the example $4 + 1 + 5$, he may know $4 + 1$, but he may not know $5 + 5$. The teacher will not know which fact he should study unless she hears him add.

Enrichment activities. The faster learners may choose other work to do at this time, such as reading a book or playing some of the games on the arithmetic table.



Bob came with 2 boxes to make a train.
Dick came with 2 more boxes.
Then John came with 3 boxes.
How many boxes were in the train?

Write the numbers. Begin at the top and add down. Write the answer.

$$\begin{array}{r}2\\2\\\underline{3}\end{array}$$

Jane was playing with her dolls.
She had 3 boy dolls and 4 girl dolls.
Mary came with 1 clown doll.
How many dolls did the girls have in all?

Write the numbers.
Begin at the top and add down.

Jane made 2 green coats for the dolls.
Then she made 2 blue coats and 4 red coats.
How many coats did she make?

Begin at the top and add down.

$$\begin{array}{cccccccccc}3&2&1&3&4&4&1&1&1&1\\2&1&5&1&2&3&4&1&6&3\\\underline{1}&\underline{4}&\underline{1}&\underline{4}&\underline{1}&\underline{1}&\underline{5}&\underline{5}&\underline{1}&\underline{3}\end{array}$$

WORKING WITH GROUPS OF EIGHT, ONE, AND NINE

Preparatory Activities

Experiences with groups of 9 are provided on page 82 in readiness for a new group of addition and subtraction facts, and as enrichment of the children's understanding of numbers.

Using concrete objects. The following plan, or a similar one, may be used to introduce the concepts:

Arrange in the front of the room 8 boys with story books and 1 girl with a toy. Ask the children how many boys there are, how many girls, and how many children.

Then ask them how many children have toys, how many have books, and again how many children there are in all.

Have the boys read and the girl play with the toy. Ask how many children there are, how many are reading, and how many are playing.

Have the boys sit in chairs and the girl stand. Ask how many children there are, how many are standing, and how many are sitting in chairs.

Now give the children these directions as they build the groups with their small counters:

Place 8 counters on your desk. Place 1 counter near them. How many are there in all?

Leave those counters on your desk and place 1 counter to start a new group. Place 8 more near it. How many are there now?

Now place 9 more counters on your desk. Move 1 of them to the left. How many are on the right?

Now place 9 more counters on your desk. Move 8 of them to the left. How many are on the right?

Using Page 82

Have the children discover that in the pictures at the top of the page some apples are on the tree and some are on the ground. Have them read the questions and write the answers.

Have the children draw the pictures in the boxes as the directions tell them.

The apples may be simple line drawings as suggested here. If they prefer, the children may make circles, squares, or lines, and pretend they are apples.

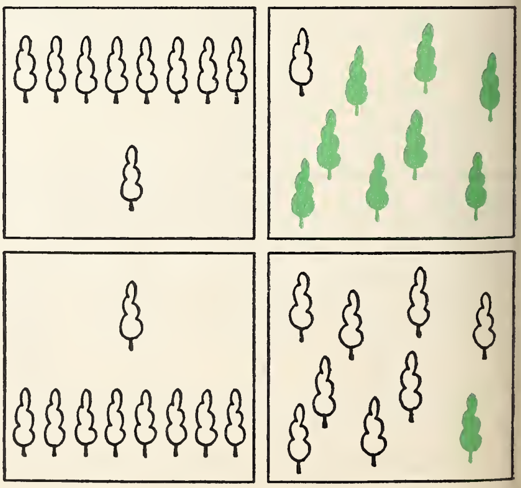
Have the children answer the questions about the apples at the bottom of the page.

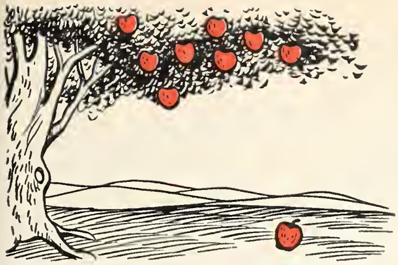
Follow-up Activities

Additional learning helps. If any of the children had difficulty, the teacher will know the type of help they need from a study of their responses. If some children found it difficult to do the reading, the teacher may help them read the directions and interpret them.

If some children need more help with groups of 9, they may repeat the suggested activity with large objects. Then they may build groups of 9 with their counters, combining 8 and 1, and 1 and 8, and taking 1 from 9, and 8 from 9.

Enrichment activities. The faster learners may make pictures on large cards to show the groups of 9.

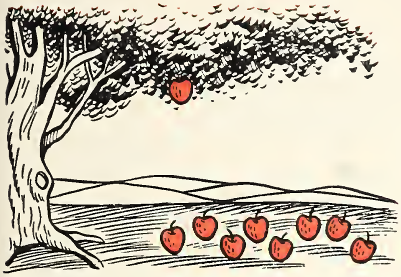




How many apples are on the tree? ____

How many are on the ground? ____

How many apples are there? ____



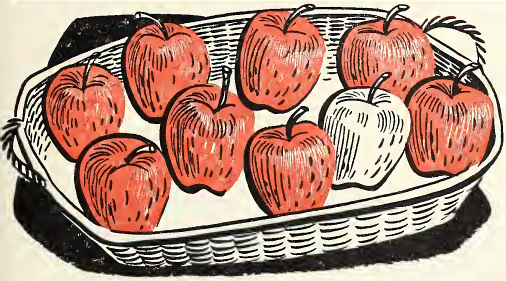
How many apples are on the tree? ____

How many are on the ground? ____

How many apples are there? ____

Draw 8 apples.
Then draw 1 more apple. ____

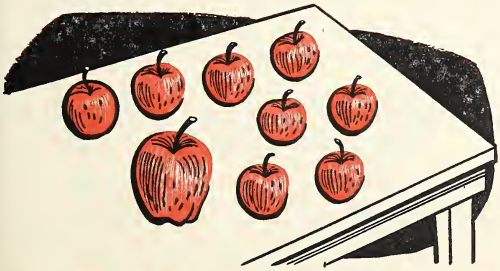
Draw 1 apple.
Then draw 8 more apples. ____



How many apples are there? ____

How many are red? ____

How many are not red? ____



How many apples are there? ____

How many are big? ____

How many are little? ____

LEARNING FOUR NEW FACTS

Preparatory Activities

The next learning unit of addition and subtraction facts is introduced through action pictures on page 83.

Dramatization. The teacher may tell these number stories, or similar ones, after which the children may dramatize the stories and write the new facts on the blackboard:

The children made pictures to use in a movie. The boys made 8 pictures of animals. The girls made 1 more picture. How many pictures of animals did the children make in all?

The boys made 1 picture of flowers for the movie. The girls made 8 pictures. How many pictures did the children make?

The children made 9 pictures of fish. They used 8 of the pictures for the movie. How many pictures were not used?

The children made 9 pictures of snakes. They used 1 of these pictures for the movie. How many pictures were not used?

Using concrete objects. Have the children discover the new facts with their counting objects. These directions may be used:

Place on your desks 8 counters. Put 1 more counter near them. How many are 8 and 1?

Place 1 more counter on your desk. Put 8 more counters near it. How many are 1 and 8?

Place 9 counters on your desk. Move 8 of them away. How many are left when you take 8 from 9?

Place 9 more counters on your desk. Move 1 of them away. How many are left when you take 1 from 9?

Using Page 83

Have the children study the pictures and write the answers for the examples as you tell these stories:

The children counted 8 birds on the feeding station. One more bird came to the station. How many birds were there then?

The children saw 1 bird in a tree. Then they saw 8 more birds fly into the tree. How many birds were in the tree then?

One day the children made 9 birds out of paper. They hung 8 of the birds in the window. How many of the birds were left?

Mary brought her collection of 9 glass birds to school. One of the birds got broken. Then how many birds were left?

Have the children study the pictures of bird houses and state the new facts from them. Then have them read the directions and write the four facts in the order in which they were introduced above.

Follow-up Activities

Additional learning helps. The introduction of the new facts provided opportunities for the children to use each fact five times. However, this may not be enough for the slower learners to learn them. If that is the case, these children may be given other stories which use the facts to dramatize. Perhaps they can make their own stories to dramatize. Then they may build the facts again, using concrete objects, and write the facts.

An illustrated study and practice card may be made for the facts. The following illustration shows a plan for the front and back of the card.

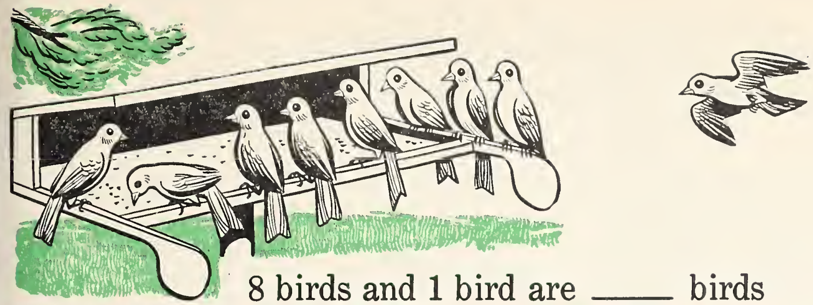
Front

$$\begin{array}{r}8\\+1\\\hline\end{array}\quad\begin{array}{r}1\\+8\\\hline\end{array}\quad\begin{array}{r}9\\-8\\\hline\end{array}\quad\begin{array}{r}9\\-1\\\hline\end{array}$$

Back

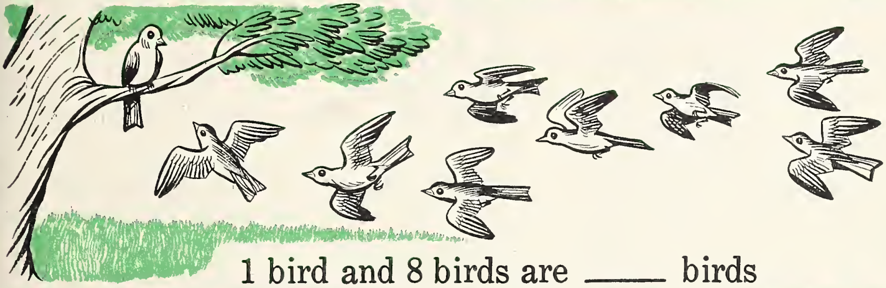
$$\begin{array}{r}8\\+1\\\hline 9\end{array}\quad\begin{array}{r}1\\+8\\\hline 9\end{array}\quad\begin{array}{r}9\\-8\\\hline 1\end{array}\quad\begin{array}{r}9\\-1\\\hline 8\end{array}$$

Enrichment activities. The faster learners who are keeping charts of the facts they have learned may put the new facts on their addition and subtraction charts.



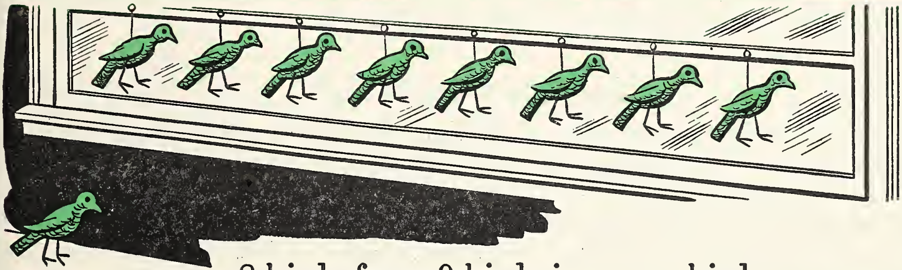
8 birds and 1 bird are ____ birds

8 birds
+1 bird
____ birds



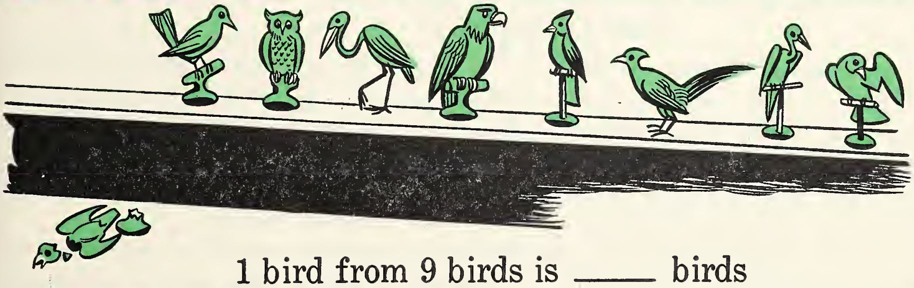
1 bird and 8 birds are ____ birds

1 bird
+8 birds
____ birds



8 birds from 9 birds is ____ bird

9 birds
−8 birds
____ bird



1 bird from 9 birds is ____ birds

9 birds
−1 bird
____ birds

+ ____   + ____   − ____   − ____

Four facts have 8, 1, and 9 in them. Write the four facts.

USING ADDITION AND SUBTRACTION IN NUMBER STORIES AND EXAMPLES

Preparatory Activities

Another opportunity to use addition and subtraction facts in number stories and in examples is provided on page 84. The exercises include column addition examples. Some of the new facts are used, along with facts introduced earlier.

Reading number stories. Some of the stories in the pupil's book are stated in a different way from those the children have had before. One story requires the use of column addition. The teacher may wish to provide similar stories for the children to read.

The stories suggested below may be written on the blackboard. The children may read them and work them out together. They may be dramatized if that seems necessary. The children should write in example form the numbers from the story that involves column addition.

Eight girls were playing house. Seven of the girls had dolls. How many did not have dolls?

The boys were playing with toys. They had 2 cars, 2 trucks, and 3 wagons. How many toys did the boys have?

The girls had 7 dolls. Four of the dolls had hats on. How many dolls did not have hats?

The teacher will wish to look over the stories in the pupil's book and anticipate the words that may cause reading difficulty. Any such words may be introduced as reading vocabulary before the children read the stories in their books.

Using Page 84

Have the children discover what the stories are about by looking at the pictures. Then ask them if they have ever played circus parade or made things for a play circus.

The children may read the stories and find the answers. If they have trouble with the stories, it may help to suggest that they think what the story tells and what the question asks.

Point out that there is a direction for each row of examples. Then have the children find the answers for the examples.

Follow-up Activities

Additional learning helps. If some of the children had difficulty with page 84, the teacher will wish to work with them individually or as a group to give them whatever help they need at this time. If they need help with reading and understanding number stories, they may be given stories to read under the teacher's supervision. These may be written on the blackboard. Sometimes it helps to have the children read the story through silently, then read it again, sentence by sentence, thinking what each sentence tells, or saying in their own words what the sentence tells. In the stories in the pupil's book, the questions are particularly important. The teacher may call upon the children to restate the question after they have read the number story.

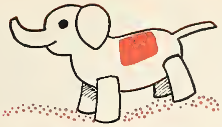
If the addition and subtraction facts caused trouble, each child may be helped to make a list of the specific facts he missed. Then he may use concrete objects and the illustrated study cards to learn those facts that were difficult for him.

If more column addition examples are needed, the teacher may choose some from the list given earlier in this book. These examples may now be added to the list:

$4 + 4 + 1$ $\quad$ $7 + 1 + 1$ $\quad$ $1 + 7 + 1$

Enrichment activities. The faster learners who are making the set of number story cards may make stories that use the four new facts just learned. The other children may choose some other work to do at this time.

The girls made a toy circus.
They made 1 little clown and 8 big clowns.
How many clowns did the girls make? ____



The girls made 9 elephants. They put 8 of them into the parade. How many of the elephants were not in the parade? ____

Mary made 9 bears for the circus.
One was a baby bear. The others were big.
How many big bears did she make? ____

Sue made 8 circus ponies. Four of the ponies had riders. How many ponies did not have riders? ____

Ruth made 1 circus wagon. Jane made 3 wagons. Mary made 2 wagons.
How many circus wagons did the girls make?

Write the numbers, and find the answer.

Add or subtract, and write the answers.

2	9	7	1	8	9	5	8	7	8
+ 5	− 8	− 2	+ 8	− 7	− 1	+ 2	− 1	− 5	+ 1

Add, and write the answers.

1	2	3	1	2	4	1	1	5	2
3	5	1	7	1	4	4	2	1	3
1	1	3	1	2	1	2	2	1	5

WORKING WITH GROUPS OF TWO, SIX, AND EIGHT

Preparatory Activities

The children are now ready for the third series of experiences with groups of 8. The experiences provided on page 85 of the pupil's book will extend their understanding of the number 8, and help prepare them for the introduction of the next learning unit of addition and subtraction facts.

Using concrete objects. The children should first discover the groups through the use of large objects. Boxes, books, or blocks are especially suitable for this activity. This plan, or a similar one, may be followed:

Arrange in the front of the room a group of 8 things such as boxes, chairs, or blocks. Have 6 at the right and 2 at the left. Ask the children how many boxes are in the group at the right, how many are in the group at the left, and how many there are in all.

Rearrange the boxes with 2 at the right and 6 at the left. Then ask how many are at the right, how many are at the left, and how many boxes there are.

Place the 8 boxes together. Ask how many there are. Then move 6 of them to the right and ask how many are at the right and how many are at the left.

Place the 8 boxes together again. Ask how many there are. Then move 2 of them to the right and ask how many are at the right and how many are at the left.

The children may use their small counters to discover the groups again. These directions may be given:

Put 6 counters on the desk. Put 2 more counters near them. How many counters are there on the desk?

Put 2 more counters on the desk. Put 6 more counters near the 2. How many counters are there in these two groups?

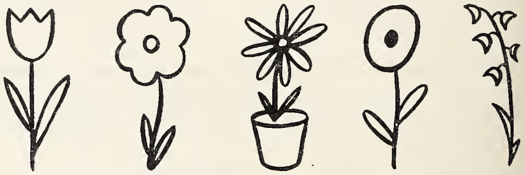
Put 8 more counters on the desk. Move 6 of them to the right. How many of the group were not moved?

Put 8 more counters on the desk. Move 2 of them to the right. How many of the group were not moved?

Using Page 85

Help the children discover that some of the flowers are on the ground and some are in the window box. Have them read the questions and write the answers.

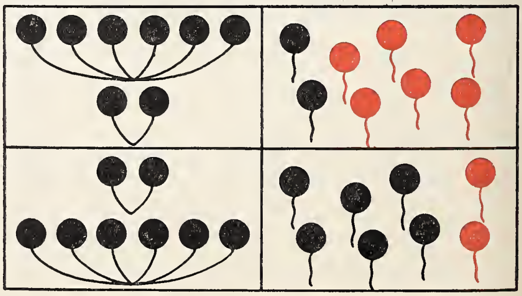
Have the children read the directions and draw the flowers. They may make simple line drawings as shown in the column at the right. Or, if they prefer, they may draw circles or squares instead of flowers.

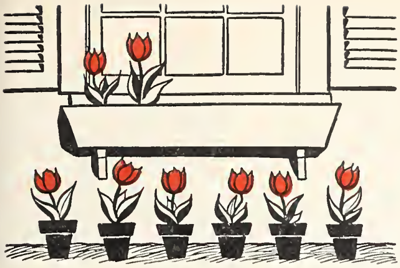


Have the children read the questions at the bottom of the page and answer them by writing numbers in the blanks.

Follow-up Activities

Additional learning helps. If some of the children require more help with groups, the experiences described under preparatory activities may be continued. These include both arrangements of large groups to be observed and experiences with small counters manipulated by the children. Then the children may make illustrated cards to show the groups. The plan shown in the picture at the right is suggested:

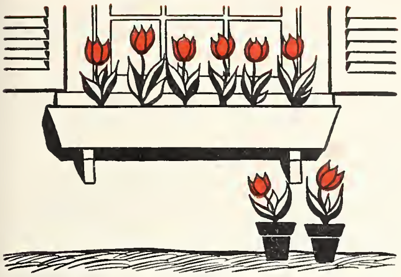




How many flowers are on the ground? ____

How many are in the window box? ____

How many flowers are there? ____



How many flowers are on the ground? ____

How many are in the window box? ____

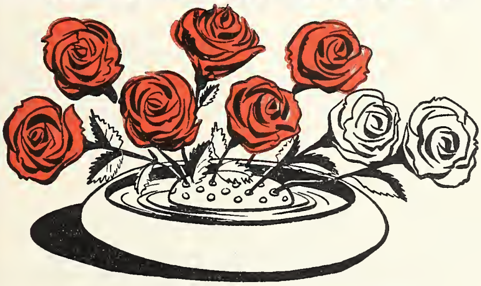
How many flowers are there? ____

Draw 6 flowers.

Then draw 2 more flowers. ____

Draw 2 flowers.

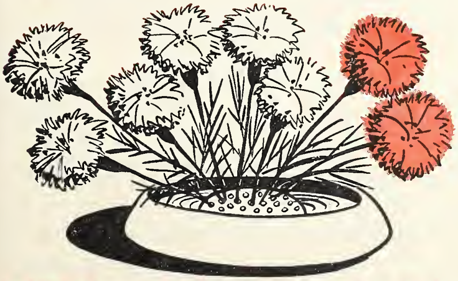
Then draw 6 more flowers. ____



How many flowers are there? ____

How many are red? ____

How many are white? ____



How many flowers are there? ____

How many are red? ____

How many are white? ____

LEARNING FOUR NEW FACTS

Preparatory Activities

A new learning unit of four facts is introduced on page 86 with pictures which illustrate oral number stories.

Dramatization. These, or similar, stories may be told by the teacher and dramatized by the children. The facts should then be written on the blackboard.

The children had a play about Indians. Six Indians were hunting. Two more Indians came to hunt. How many Indians were hunting?

Two Indian women were making tepees. Six more Indian women came to help. How many Indian women were making tepees?

Eight Indian boys were riding ponies. Six of the boys got off and went to catch fish. How many boys were riding then?

Eight Indian girls were making bowls. Two of the girls went to find wood for the fire. How many girls were making bowls then?

Using concrete objects. The children should now build the new facts with counters. These directions may be given:

Put 6 counters on your desks. Put 2 more counters near them. How many are 6 and 2?

Put 2 more counters on your desks. Put 6 more counters near them. How many are 2 and 6?

Put 8 more counters on your desks. Move 6 of them to the right. How many are left when you take 6 from 8?

Put 8 more counters on your desks. Move 2 of them to the right. How many are left when you take 2 from 8?

Look at the groups of counters and say the four addition and subtraction facts.

Using Page 86

Let the children discuss the circus pictures. Then tell these stories as the children study the pictures and write the answers for the examples.

At the circus, Bob saw 6 clowns on the ground. Two more clowns jumped off of a house. How many clowns were there?

Two clowns climbed into a fire truck. Six more clowns climbed in. How many clowns were in the truck then?

There were 8 clowns walking a tightrope. Six clowns fell off. Then how many clowns were on the tightrope?

There were 8 clowns in all. An elephant carried 2 clowns away. How many clowns were left?

Have the children study the picture of the clowns' hats, and state the new facts. Then let them read the instructions and write the four facts.

Follow-up Activities

Additional learning helps. The slower learners may dramatize other stories. They may build the facts again with counting objects, and write the facts. Each child may make a study card for the facts, as follows:

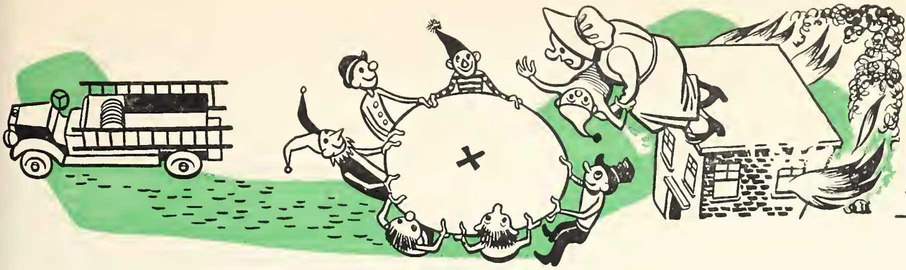
Front

$$\begin{array}{r} 6 \\ +2 \\ \hline \end{array} \qquad \begin{array}{r} 2 \\ +6 \\ \hline \end{array} \qquad \begin{array}{r} 8 \\ -6 \\ \hline \end{array} \qquad \begin{array}{r} 8 \\ -2 \\ \hline \end{array}$$

Back

$$\begin{array}{r} 6 \\ +2 \\ \hline 8 \end{array} \qquad \begin{array}{r} 2 \\ +6 \\ \hline 8 \end{array} \qquad \begin{array}{r} 8 \\ -6 \\ \hline 2 \end{array} \qquad \begin{array}{r} 8 \\ -2 \\ \hline 6 \end{array}$$

Enrichment activities. The faster learners may make a single card for each of the new facts for the game table. Then they may make an illustrated card for the four related facts.



6 clowns
+ 2 clowns

6 clowns and 2 clowns are ____ clowns

____ clowns

2 clowns
+ 6 clowns

2 clowns and 6 clowns are ____ clowns

____ clowns

8 clowns
− 6 clowns

6 clowns from 8 clowns is ____ clowns

____ clowns

8 clowns
− 2 clowns

2 clowns from 8 clowns is ____ clowns

____ clowns

+ ____ + ____ − ____ − ____

Four facts have 6, 2, and 8
in them. Write the four facts.

USING ADDITION AND SUBTRACTION IN NUMBER STORIES AND EXAMPLES

Preparatory Activities

The number stories and examples on page 87 provide practice in using some of the facts just learned and some that were learned earlier. The comparison step in subtraction is used in some of the stories. Column addition examples are also provided.

Reading number stories. The teacher will wish to give another directed lesson in reading number stories before the pupils use the exercise in their books. The children may be told that sometimes the question in the number story helps them know how to find the answer. Suggest that they read the question again if a story is difficult for them. These stories may be written on the blackboard:

The children were talking about the books they have at home. Helen said that she had 9 books about pets. Alice had 8 books about pets. How many more books about pets did Helen have than Alice?

Tom had 1 book about trains and 8 books about airplanes. How many books did he have about these things?

Andy had 7 books about birds and Ed had 6. How many more books about birds did Andy have than Ed?

The teacher will wish to introduce words in the stories on page 87 which are likely to cause reading difficulty. This will enable the children to read the stories with their attention focused upon the thought.

Using Page 87

The children will learn from a discussion of the picture that the number stories are about some children who are painting. Then they may be told to read the stories carefully and think about them as they read. The teacher will observe the children as they work to find those who need help and encouragement.

After the number stories are finished, the children may read the directions at the foot of the page and write the answers for the examples.

Follow-up Activities

Additional learning helps. The children who had difficulty may be given whatever help they need. The teacher may need to help them study the number stories in their books. It may be helpful to have them make pictures to illustrate the stories to show what they are to do to find the answers. It may also be helpful to have them read the stories orally.

If the children need help with some of the facts used in the stories and the examples, they may find which facts caused them trouble and study those facts again. They will need to use concrete objects again to find the correct answers. Then they may study the illustrated study cards and write the facts. Just writing them is not enough. The children who learn slowly need the help of the developmental exercises to visualize the facts again before they practise writing them.

The teacher may need to make a set of practice examples in column addition. If so, she may choose examples from the list provided earlier. These examples may now be included also:

1	1	5	2	4	3	2	6
1	5	1	4	2	3	6	2
6	2	2	2	2	2	1	1

Enrichment activities. The children who are making the set of number story cards may write, and illustrate, stories that use the four new facts. Each story may be put on a card to be used later by children who may need to use them.

The children were painting. Dick painted a basket with 8 red eggs and 2 blue eggs in it. How many more red eggs than blue eggs were there? ____

John painted a road with 8 wagons and 6 cars on it. How many more wagons than cars were there? ____

Mary painted a tree with 8 red apples and 1 green apple on it. How many apples were on the tree? ____

Ruth painted a window box. It had 2 red flowers and 6 yellow flowers in it. How many flowers were in the window box? ____

Tom painted 7 airplanes and 1 boat. How many more airplanes than boats did he paint? ____

Add or subtract, and write the answers.

7	1	8	9	2	7	8	8	9	6
− 2	+ 8	− 6	− 8	+ 6	− 5	− 2	+ 1	− 1	+ 2

4	1	3	1	1	4	1	2	2	7
1	5	3	1	2	2	4	6	3	1
5	2	1	6	1	2	1	1	2	1

USING COLUMN ADDITION IN NUMBER STORIES; MAINTAINING SKILL IN TELLING TIME

Preparatory Activities

A set of number stories using column addition is provided on page 88. An exercise is provided also to help the children maintain their skill in telling time.

Using column addition in number stories. The children may need to be reminded again about writing the numbers in example form when the stories require column addition. The teacher may help them recognize stories that require column addition by calling attention to the fact that some number stories tell more than two things.

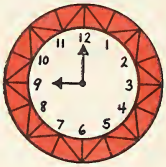
Then the children may read some stories from the blackboard and find the answers. These stories may be used:

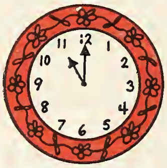
Mary was reading library books last week. She read 3 books about animals, 1 book about an airplane, and 1 book about a doll. How many books did Mary read?

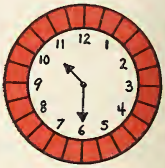
Fred made some cards for his friends. He made 2 birthday cards and 1 get-well card. Then he made 3 cards asking friends to come for a visit. How many cards did Fred make?

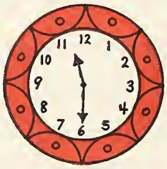
Alice painted pictures for her room. She painted 3 pictures of birds and 1 picture of a tree. The next day she painted 4 pictures of flowers. How many pictures did Alice paint for her room?

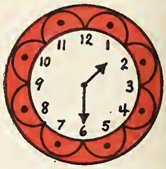
Using pie-plate clocks. The teacher will wish to have the children use their "make believe" clocks for practice. Several clocks may be set to show the schedule of the activities for the day. Then the children may tell the time each clock shows. For example:


Reading


Story Hour


Play


Lunch


Arithmetic

Using Page 88

Have the children read the number stories and find the answers.

Call attention to the words below the pictures of clocks. Have the children read the first line. Then have them find the clock that shows 2 o'clock and draw a line from the words to that clock. Let them finish the exercise following the same plan.

Follow-up Activities

Additional learning helps. If there are some children who cannot tell time, the teacher may work with them, using a real clock or their paper clocks. The children may set their clocks at 12 o'clock, then at 12:30, etc., around the clockface. After this practice they should be able to correct the mistakes in their books.

If some of the children had difficulty reading the number stories, the teacher will wish to help them read the stories again. They may make pictures to illustrate the stories, or dramatize them.

If help is needed in column addition, it will be a good idea for the children to use concrete materials again to learn how to add more than two numbers. Perhaps certain of the addition facts will need further attention.

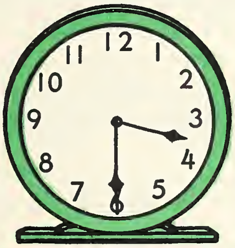
Enrichment activities. The children who do not need help may use some of the games on the arithmetic table, or may choose another activity if they prefer to do so.

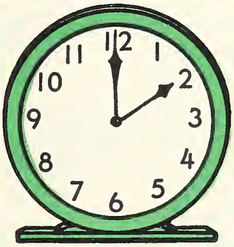
One day Dick asked 2 girls and 4 boys to his birthday party. The next day he asked 2 more girls to come. How many children did Dick ask to the party?

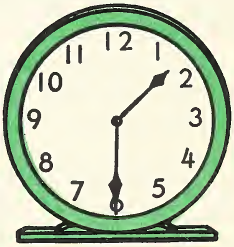
Write the numbers.
Find the answer.

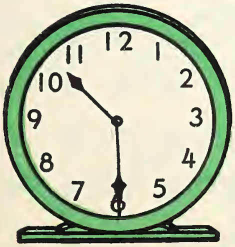
Dick made 1 green hat, 6 red hats, and 1 blue hat for the party. How many hats did he make?

The children gave Dick 3 boats, 2 airplanes, and 2 tops. How many toys did he get in all?

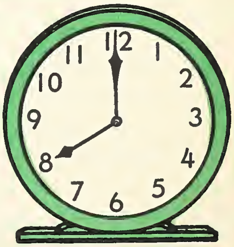








two o'clock
half past one
half past three
eight o'clock
half past ten



WORKING WITH GROUPS OF THREE, FIVE, AND EIGHT

Preparatory Activities

The last series of experiences with groups of 8 is provided on page 89.

Using concrete objects. Concrete objects should be used to introduce the groups. Then each child should discover the groups for himself, using small objects at his desk. This procedure may be used:

Hold 5 pencils in the right hand and 3 in the left. Extend the right hand and ask the children how many pencils are in it. Do the same thing with the left hand. Then ask how many there are in all.

Rearrange the pencils with 3 in your right hand and 5 in your left hand. Repeat the questions.

Hold the 8 pencils in your right hand and ask how many there are in all. Then take 5 in your left hand and ask how many are in that hand and how many are in the other hand.

Hold the 8 pencils together again and have the children tell how many there are. Then take 3 in the other hand and repeat the questions.

Have the children build the groups with their counters, following these directions:

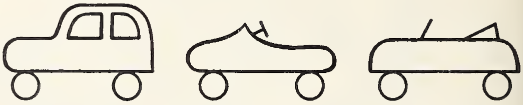
Put 5 counters on the desk. Put 3 more near them. How many counters are on the desk now?

Have the children build the groups with 3 and 5 in the same way. Then have them separate a group of 8 into groups of 5 and 3. Repeat with a group of 8 separated into groups of 3 and 5.

Using Page 89

Have the children read the questions at the top of the page and write the answers.

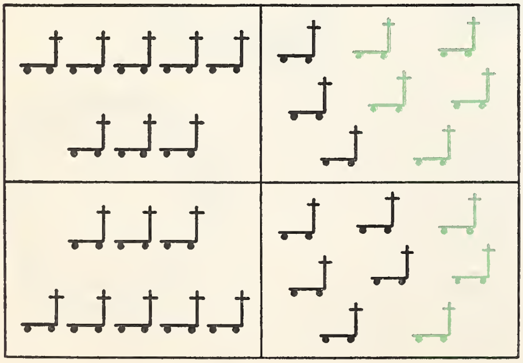
Then have them draw cars as directed. The cars may be simple line drawings as shown here, or squares or rectangles may be drawn instead of cars.



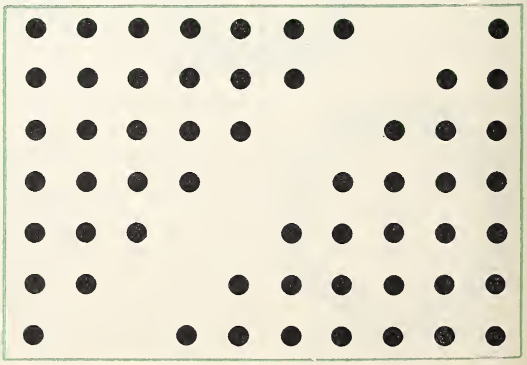
Next, the children may answer the questions at the bottom of the page.

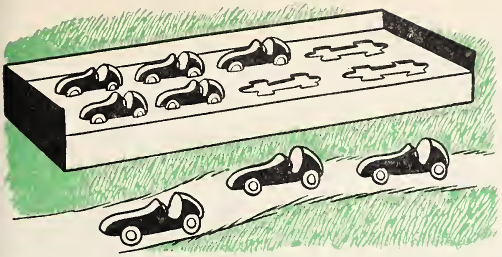
Follow-up Activities

Additional learning helps. If any children need more opportunities to learn, they may be given more experiences with both large and small objects. After they have built the groups, they may make illustrated cards to show the groups. This plan may be used:



Enrichment activities. The children who do not need more help with groups of 8 may make a chart to show all of the groups of 8 which they have studied. This will help them bring the groups together and see the relationships among them. This plan may be used:

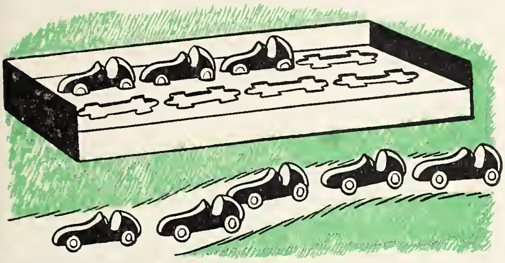




How many cars are in the box? ____

How many are on the road? ____

How many cars are there? ____



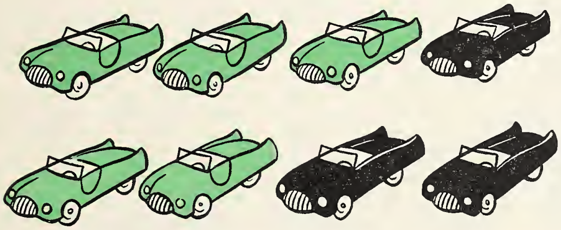
How many cars are in the box? ____

How many are on the road? ____

How many cars are there? ____

Draw 5 cars.
Then draw 3 more cars. ____

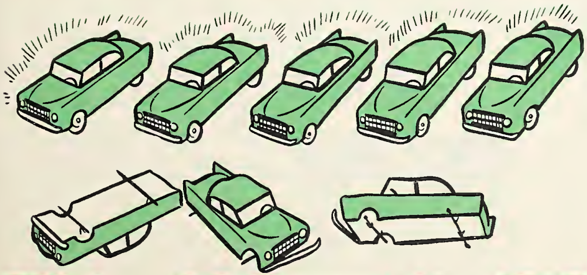
Draw 3 cars.
Then draw 5 more cars. ____



How many cars are there? ____

How many are green? ____

How many are black? ____



How many cars are there? ____

How many are broken? ____

How many are not broken? ____

LEARNING FOUR NEW FACTS

Preparatory Activities

The new facts introduced on page 90 are the last group of addition and subtraction facts with sums or minuends of 8.

Dramatization. These stories may be used to dramatize the new facts, unless the teacher prefers to use stories growing out of actual classroom experiences.

The children were playing farmer. Five farmers were loading hay. Three more farmers came to help. How many farmers were loading hay in all?

Three farmers were taking pigs to market. Five more farmers came to help. How many farmers were taking pigs to market then?

Eight farm women were canning apples. Five of the women went home to cook dinner. How many women were canning apples then?

Eight girls were picking apples. Three of the girls went to get a ladder. How many girls were picking apples then?

After the children dramatize the stories and write the facts on the blackboard, they may build the facts with their counters. These directions may be given:

Put 5 counters on your desks. Put 3 more counters near them. How many are 5 and 3?

Put 3 more counters on your desks. Put 5 more counters near them. How many are 3 and 5?

Put 8 more counters on your desks. Move 5 counters to one side. How many are left when you take 5 from 8?

Put 8 more counters on your desks. Move 3 counters to one side. How many are left when you take 3 from 8?

Look at the counters on your desks and say the facts.

Using Page 90

Tell these stories as the children study the pictures about the dog show and write the answers for the examples.

Five children were looking at the dogs. Three more children came. Then how many children were there?

Three dogs were in boxes. The children brought 5 more. How many dogs were there in all?

Eight dogs were in boxes. Five of the dogs got out of the boxes. How many of the dogs were in boxes then?

Eight children were at the show. Three of the children went home. How many children were still at the show?

Have the children study the composite picture and say the facts. Then have them write the facts.

Follow-up Activities

Additional learning helps. The children who need more opportunities to learn the facts may make up stories that use the facts and dramatize them, build the facts again with their counters and write them, and make study and practice cards for the facts.

Front

$\begin{array}{r} 5 \\ +3 \\ \hline \end{array} \qquad \begin{array}{r} 3 \\ +5 \\ \hline \end{array} \qquad \begin{array}{r} 8 \\ -5 \\ \hline \end{array} \qquad \begin{array}{r} 8 \\ -3 \\ \hline \end{array}$

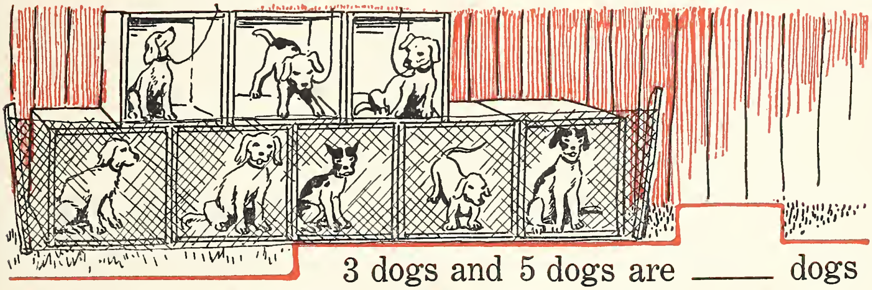
Back

$\begin{array}{r} 5 \\ +3 \\ \hline 8 \end{array} \qquad \begin{array}{r} 3 \\ +5 \\ \hline 8 \end{array} \qquad \begin{array}{r} 8 \\ -5 \\ \hline 3 \end{array} \qquad \begin{array}{r} 8 \\ -3 \\ \hline 5 \end{array}$

Enrichment activities. The children who are keeping charts of the facts learned may add the new facts to their charts. Those who are making the sets of practice and study cards for the game table may make a single card for each new fact.

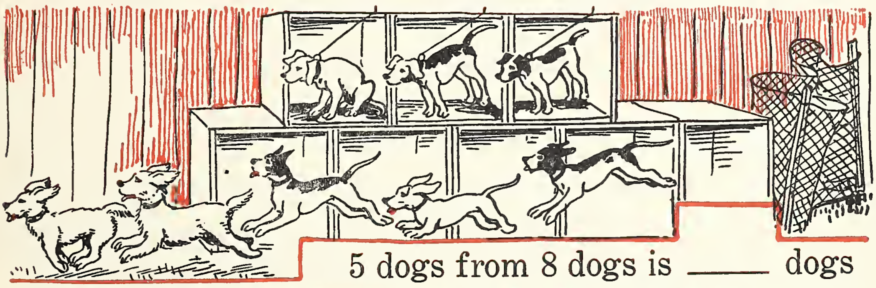
5 children and 3 children are ____ children

5 children
+ 3 children
____ children



3 dogs and 5 dogs are ____ dogs

3 dogs
+ 5 dogs
____ dogs

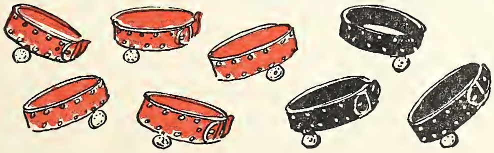


5 dogs from 8 dogs is ____ dogs

8 dogs
− 5 dogs
____ dogs

3 children from 8 children is ____ children

8 children
− 3 children
____ children



+ ____   + ____   − ____   − ____

Four facts have 5, 3, and 8
in them. Write the four facts.

USING ADDITION AND SUBTRACTION IN NUMBER STORIES AND EXAMPLES

Preparatory Activities

Some of the facts just learned and some of those learned earlier are used in the number stories and the examples on page 91. The comparison concept of subtraction is also used in some of the number stories.

Reading number stories aloud. Skill in problem solving develops very slowly. Practice in reading and interpreting problems contributes a great deal to growth. Teacher guidance must be based upon the needs of the children. Since children reveal their needs best when they work out problems as a group activity, it is an excellent plan to give them an opportunity to read number stories aloud and find the answers together.

These stories may be written on the blackboard for the children to read and think through together:

The children took things to school to use in science. Ann took 7 shells and Betty took 2. How many more shells did Ann take than Betty?

John took 3 pictures of birds and Tim took 5. How many pictures of birds did the boys take?

Ben found 10 stones to take to school. He took 5 of them one day. How many stones did he have left to take to school?

Bob took 8 pictures of trees to school and Sue took 6. How many more pictures did Bob take than Sue?

The teacher will wish to examine the number stories in the pupil's book to anticipate vocabulary difficulties. Any words that are new to the children should be introduced before the exercise is used. This will free the children to think about the stories rather than the vocabulary.

Using Page 91

After the children discuss the pictures to find what the number stories are about, they may read the stories silently and find the answers. The teacher will give help to individual children who have difficulty. When the children have finished the number story exercise, they may read the directions above the examples and find the answers.

Follow-up Activities

Additional learning helps. If any of the children had difficulty with the number stories, the teacher will wish to give them whatever help they need. She may find that they will be able to interpret the number stories if they read them aloud. Sometimes hearing the teacher read the story enables the children to get its meaning, too. It may also help to tell or read number stories to the children and have them repeat the story in their own words. It may be well to point out again that a problem tells a story and asks a question about the story. We think about the story the problem tells to decide how to find the answer to the question.

If any of the children made mistakes because they did not know certain of the addition and subtraction facts, they should be helped to find which facts they do not know. The children should use concrete objects to find the correct answers. Then they may use the illustrated study cards to learn the facts. When they are sure of the facts that they missed they may write them three or four times.

Enrichment activities. The children who are making number story cards for the game table may make stories that use each of the new addition and subtraction facts. The other children may enjoy sorting out all of the cards for the facts having sums or minuends of 8. Then they may want to see if they can say all of these addition and subtraction facts.

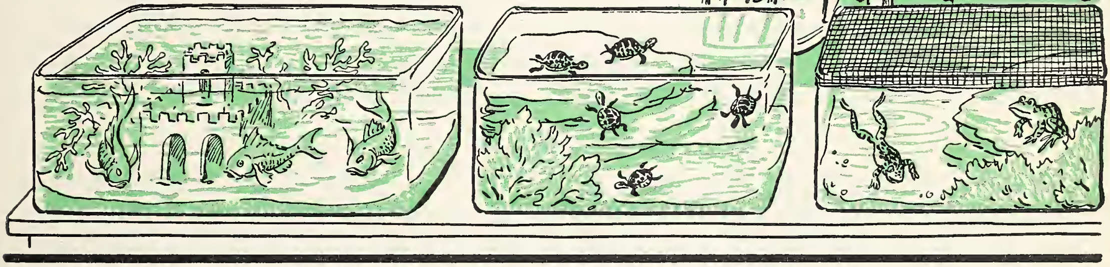
The children have some new books at school. They have 6 books about pets and 2 books about airplanes. How many new books have they? ____

Tom has read 7 of the new books. Bob has read 3 of them. How many more has Tom read than Bob? ____

Mary wants to read the 8 new books. She has read 5 of them. How many are left for her to read? ____

The children had some pets at school. They had 5 turtles and 3 frogs. How many pets did they have? ____

Ruth took 2 fish to school. Sue took 5 fish. How many fish did the girls take to school? ____



Add or subtract, and write the answers.

1	8	5	1	9	2	8	5	6	8
+ 8	− 2	+ 3	+ 7	− 1	+ 6	− 5	+ 2	− 4	− 6
7	9	6	2	3	6	8	8	2	8
− 5	− 8	+ 2	+ 4	+ 5	− 3	+ 1	− 3	+ 5	− 1

LEARNING TO COUNT BY TWOS TO TWENTY

Preparatory Activities

The children are now ready to learn to count to 20 by twos. Exercises for this purpose are provided on page 92.

Realistic counting experiences. Ideally, the preparatory activities provided should stem from a need for counting by twos. If classroom activities lend themselves to this purpose, they may be used. If not, these activities may be suggested:

The children may be asked to read the numbers on the number chart, beginning with 2 and omitting every other number, thus: 2, 4, 6, 8, etc. It will help to pin small squares of paper over the odd numbers.

Then 20 children may be arranged in pairs around the room. The teacher may suggest that they be counted and explain that counting by twos is a quicker way to do it. Several children may try to count them by twos. The chart with the odd numbers blocked out will help them.

Next, the children may use their concrete objects to practise counting. Ask each child to place on his desk 20 counters. Have each child arrange his counters in a row. Let the children count by twos, moving the counters by twos as they count. If they have trouble, it may help to suggest that they count by ones but emphasize every other number, thus: 1, **2**, 3, **4**, 5, **6**, 7, **8**, etc. Soon all the children should be able to omit the odd numbers.

The children may practise counting real pennies or toy pennies. They may be shown how adults use 2 fingers and move 2 pennies at a time as they count them.

Using Page 92

The children are to write the even numbers, which are missing, in the first exercise on the page. Then they may practise reading the numbers they wrote.

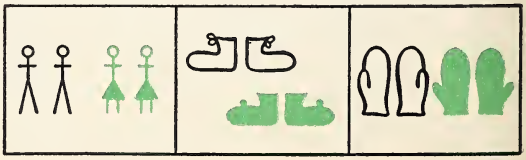
The next exercises are stepped up over the counting experiences, since the children count by twos and write the numbers as they count. They have had preparation for this in counting by fives and tens. They are to write the number that tells how many birds and pennies they counted. (Remind them to use the cent sign.) This helps them understand that, in counting, the last number we say tells how many there are in all.

Follow-up Activities

Additional learning helps. If the concept of counting by twos caused trouble, the children may work with concrete objects, going gradually from counting by ones to counting by twos. The teacher may help by asking questions as the children count. For example, place 2 blocks on the table and ask, "How many blocks are there?" Place two more blocks on the table and ask, "How many are there now?" Place two more blocks on the table and ask, "How many are there now?" Then have the children count by twos all the blocks so far placed on the table. Continue this procedure, stopping for recounts once or twice more, until 20 blocks have been placed upon the table, and counted.

If the trouble was caused by having the children write the numbers as they counted, more experience is probably all they need. The previous activity may be used again. This time, have the children write the numbers to answer the questions as they count aloud.

Enrichment activities. The faster learners may enjoy extending their skill by counting to 100 by twos. They may be given the word "pair" and taught its meaning. Then they may enjoy making pictures of things by pairs, or twos.

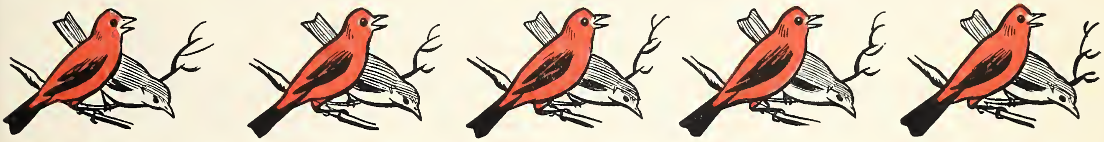


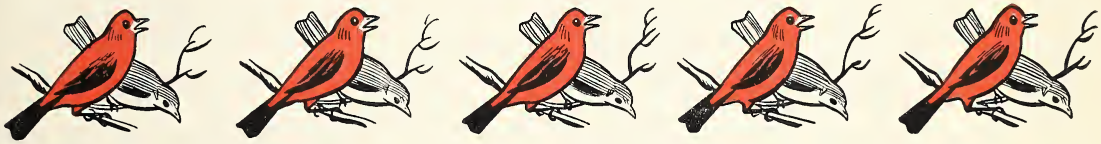
Write the numbers that are left out.

1		3		5		7		9	
11		13		15		17		19	

Read the numbers you wrote.

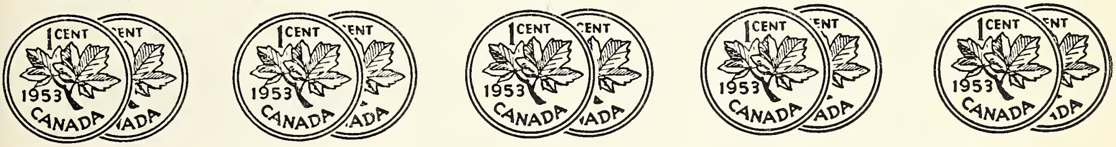
Count by twos. Write the numbers you say.

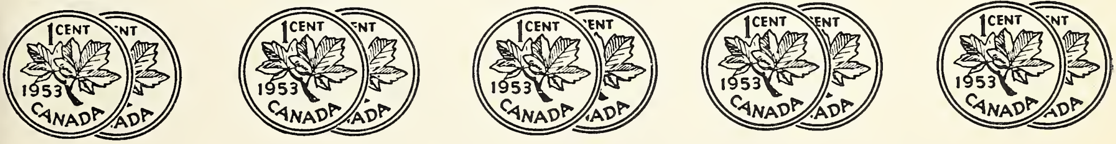




How many birds did you count? ______

Count by twos. Write the numbers you say.





How much money did you count? ______

SUBTRACTING TO FIND HOW MANY MORE ARE NEEDED; HOW MUCH MORE IS NEEDED

Preparatory Activities

Learning to subtract to find how many more are needed or how much more is needed is difficult for some children because it is not easy to visualize. The exercises on page 93 introduce this concept of subtraction with pictures and number stories which provide clues for the visualization. Gradually the transition is made to the generalization that we can use subtraction to answer the questions.

Demonstrating the concept. These activities may be used to help the children understand the concept.

Arrange 6 chairs in the front of the room. Call 8 children to sit in the chairs. Then ask if there are enough chairs, and how many more are needed. The children will find the answer through a combination of one-to-one correspondence and subtraction to find how many more children there are than chairs. Perhaps they can explain how they found the answer. Then the teacher may tell them that we can subtract 6 from 8 to find the answer.

Now give a child 3 books and ask him to pass them to the 8 children. Let the children find how many more books are needed. Then put the example on the blackboard and subtract.

Using pictures of objects. Say to the children, "Nine boys want to play cowboy. They have 8 ponies. How many more ponies do they need?" The children may make pictures of the cowboys and the ponies to find how many more are needed. Or they may play the story letting chairs serve as ponies. Then the example may be written.

Say to the children, "John has a dime. He wants to change it for pennies. Mother has 5 pennies. How many more pennies does she need if she is to give John pennies for the dime?" Pictures or toy money may be used to work out the answer. Then the example may be written.

Using Page 93

The number stories should be worked out as a group activity. The children should be led gradually to the generalization that we subtract to find how many more are needed or how much more is needed. Such questions as the following will help them understand this generalization: "8 doll hats are how many more than 2 doll hats?" "3 cents is how much less money than 8 cents?" "Dick has 2 cents. How much more money does he need to have 8 cents?"

The cent sign should be used as needed.

Follow-up Activities

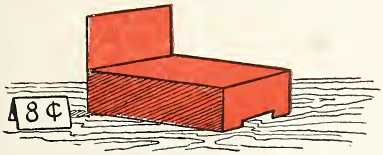
Additional learning helps. The children who had difficulty with page 93 probably need experiences with dramatization and demonstration with concrete materials to develop the concept. Experiences such as the following may be developed:

"John needs 9 wheels for the airplanes he is making. He has 8 wheels. How many more does he need?" The places for the 9 wheels can be pointed out and the 8 wheels can be pictured. The child can be led gradually to think, "8 from 9 is 1."

Enrichment activities. The children who need no further help in understanding this type of subtraction situation may be interested in making bundles of 100 counting sticks. These will be useful later when the numbers to 200 are introduced and the teacher works with the slower learners. There should be a few bundles of 100. Each such bundle should be made up of 10 smaller bundles of 10 each. Toothpicks, milk straws, small pieces of cardboard, or counting sticks may be used.

Sue needs 7 coats for her dolls.
She has 6 doll coats.
How many more coats does she need? ____

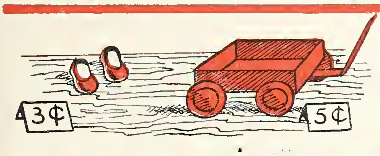
Mary needs 7 hats for her dolls.
She has 2 doll hats.
How many more hats does she need? ____



Sue needs 8 cents to buy a doll bed.
She has 3 cents.
How much more money does she need? ____

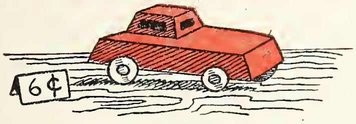
Subtract, and write the answer.

Dick needs 8¢ to buy a boat. He has 2¢.
How much more money does he need? ____



Ruth wants to buy doll shoes
for 3 cents and a wagon for 5 cents.
How much money does she need? ____

John wants to buy an airplane
for 8 cents. He has 5 cents.
How much more money does he need? ____



Tom has 8 cents.
He wants to buy a car for 6 cents.
How much money will he have left? ____

Bob wants to buy a ball for 1 cent, a top
for 2 cents, and a wagon for 5 cents.
How much money does he need?

LEARNING TO READ NUMBERS TO TWO HUNDRED

Preparatory Activities

Children in Grade Two frequently need to read numbers beyond 100, but seldom to write them. After they learn to read numbers to 100, they can quite easily go beyond that number. Page 94 helps the children see the relationship between the numbers to 100 and those to 200, and helps them learn to read numbers to 200.

Motivated experiences in reading numbers. The teacher will wish to capitalize upon opportunities that occur in the classroom for having the children read numbers. These will likely relate to locating stories in books, or to recording the number of children who attended the school play or auditorium session, etc. In addition to those experiences, this activity may be used:

Have the children notice the last page they used in their arithmetic books. Then suggest that they look ahead to see what will be coming in arithmetic. They may follow through page by page to the end of the book, reading the page numbers, with the teacher's help, and commenting on the pictures. Then the teacher may list on the blackboard certain page numbers and ask the children to find what the pictures are about on this page (117 for example). Let all of the children find the page and have a child describe the pictures. Care must be taken to help the children say "one hundred seventeen," not "one hundred *and* seventeen." The "and" is used in reading mixed numbers, such as 1.17 (one *and* seventeen hundredths), $1.17 (one dollar *and* seventeen cents), or $1\frac{17}{25}$ (one *and* seventeen twenty-fifths). If children use *and* in reading whole numbers, they will have difficulty in understanding its function when mixed numbers are introduced.

Making a new number chart. The children may help build a new number chart. The teacher writes the numbers in columns of 10, from 101 to 200, as the children say them. When the chart is completed, they may note that it is just like the chart of numbers to 100 except that each number has 1 at the left to show that it means one hundred five, one hundred ten, etc.

Using Page 94

The exercise in writing numbers serves two purposes. It maintains skill in writing numbers and helps show the sequence of the numbers to 200.

After the children have written the numbers, they may read them from 80 to 100, and then right on to 200. Have one child read to 120, another to 140, etc. Then have the children find the column that begins with 151 and read that column. Find the number that comes before 141 and the number that comes after, read all of the numbers that end in 5, read the even numbers, 102, 104, etc., find the number that has two zeros and read it, find the number that shows how many pages there are in this book, etc.

Follow-up Activities

Additional learning helps. Some of the slower learners will probably need more help in reading numbers to 200. These children will profit from experiences with rational counting. Bundles of tens of counting sticks and single sticks may be used. Have the children count single sticks to 20. Then have them lay down bundles of 10 as they count by tens from 20 to 90. Then they may count by ones from 90 to 100, placing a stick on the table each time they say a number. Now have them go right on counting by ones and touching the sticks or placing them with the others—101, 102, 103, etc. They should soon sense the relationship between the numbers to 200 and those to 100.

Following this experience, the charts may be used again for experiences in reading the numbers. The plan suggested under preparatory activities may be used again.

Write the numbers that are left out.

1	11	21	31		51				
2	12		32	42	52	62			
3		23		43		63			
4			34				74		
5	15		35		55			85	
6	16	26		46		66			
7			37		57				
8	18			48			78		
9	19	29	39	49	59				
10	20	30	40			70			

Read the numbers from 101 to 200.

101	111	121	131	141	151	161	171	181	191
102	112	122	132	142	152	162	172	182	192
103	113	123	133	143	153	163	173	183	193
104	114	124	134	144	154	164	174	184	194
105	115	125	135	145	155	165	175	185	195
106	116	126	136	146	156	166	176	186	196
107	117	127	137	147	157	167	177	187	197
108	118	128	138	148	158	168	178	188	198
109	119	129	139	149	159	169	179	189	199
110	120	130	140	150	160	170	180	190	200

WORKING WITH GROUPS OF NINE, ONE, AND TEN

Preparatory Activities

The next series of experiences with groups of 10 is provided on page 95.

Using concrete objects. As has been done in the treatment of other groups, concrete objects should be used to introduce the group. A plan similar to the one described below may be followed:

Have 9 girls and 1 boy stand at the blackboard. Ask all of the children except 1 girl to draw pictures. Ask how many children are drawing, how many are not drawing, and how many children are at the blackboard. Then ask how many boys there are, how many girls, and how many children.

Have the children stand in a group. Ask how many are in the group. Have 9 children move to one side. Ask how many are at that side and how many at the other side.

Have the children form a single group again. Ask how many children there are. Then have 1 child step to one side. Ask how many are at that side and how many at the other side.

Have the children get out their boxes of counters. Then give these directions as they build the groups on their desks:

Put 9 counters on the desk. Put 1 more counter near them. How many counters are there on the desk?

Now put 1 counter on the desk. Put 9 counters near it. How many did you put on the desk this time?

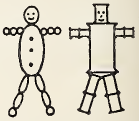
Put 10 counters in a group on the desk. Move 9 of them to the left. How many are there in all? How many are at the left? How many at the right?

Put 10 more counters in a group. Now move 1 to the left. How many counters are there in all? How many are at the left? How many at the right?

Using Page 95

Discuss the pictures to bring out the fact that these are china dolls, sometimes called figurines. Help the children discover that in each cabinet some dolls are at the left and some are at the right. Then have them study the pictures and answer the questions.

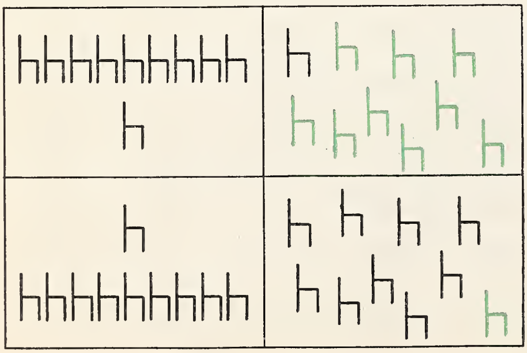
Have the children read the directions and draw the dolls. The dolls may be simple stick figures, or the children may draw other things if they wish.



Have the children study the pictures at the bottom of the page and answer the questions.

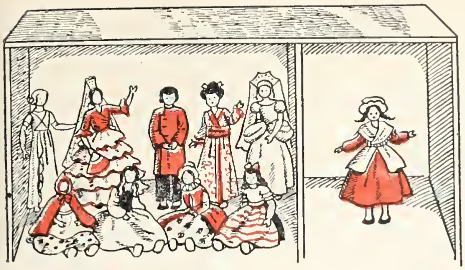
Follow-up Activities

Additional learning helps. The children may make illustrated cards showing the groups. This plan may be used:



Enrichment activities. If they wish, the faster learners may make an illustrated card for the game table similar to the one just described. If they prefer, they may work with the foot ruler and yardstick to practise measuring, or they may want to use the materials on the arithmetic table that show halves and fourths to refresh their memory about these fractions.

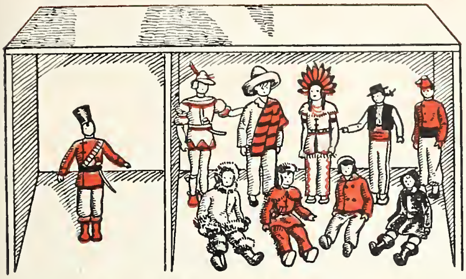
Some of the faster learners may be interested in making a chart of the numbers to 200 similar to the number chart at the foot of page 94 in their books. These charts may be kept in their arithmetic folders or scrapbooks.



How many dolls are at the left? ______

How many are at the right? ______

How many dolls are there? ______



How many dolls are at the left? ______

How many are at the right? ______

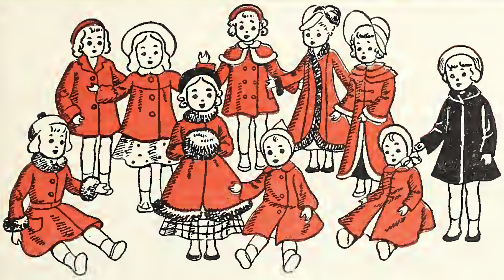
How many dolls are there? ______

Draw 9 dolls.

Then draw 1 more doll. ______

Draw 1 doll.

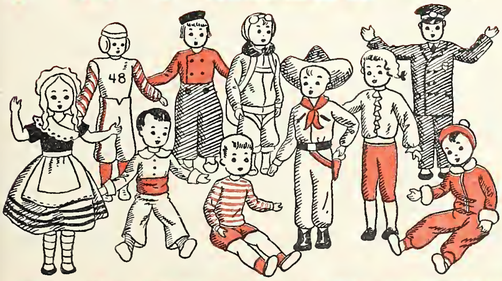
Then draw 9 more dolls. ______



How many dolls are there? ______

How many have red coats? ______

How many have black coats? ______



How many dolls are there? ______

How many are girl dolls? ______

How many are boy dolls? ______

LEARNING FOUR NEW FACTS

Preparatory Activities

The addition and subtraction facts in this learning unit are introduced through pictures that illustrate oral number stories and help the children write the answers for the examples.

Dramatization. The teacher may plan stories to dramatize, or these may be used:

Ted went to the store and bought 9 round balloons and 1 long balloon. How many balloons did he buy?

Ted bought some hooks to fasten the cars of his train together. He bought 1 long hook and 9 short hooks. How many hooks did he buy?

Ted saw 10 marbles in a box. He bought 9 of them. How many marbles were left?

Ted saw 10 goldfish in an aquarium at the store. He bought 1 fish. How many fish were left?

Have the children build the facts with their counters, following these directions:

Put 9 counters on your desk. Put 1 more near them. How many counters are there on your desk? How many are 9 and 1?

Put 1 more counter on your desk. Put 9 more near it. How many counters are there this time? How many are 1 and 9?

Put 10 more counters on your desk. Move 9 of them away. How many are left when you take 9 from 10?

Put 10 more counters on your desk. Move 1 of them away. How many are left when you take 1 from 10?

Look at the counters and say the facts.

Using Page 96

If the children cannot identify the birds in the pictures, point out that the birds in the first picture are egrets, those in the next picture are pelicans, those in the third picture are ruffed grouse, and those in the fourth picture are pheasants.

These stories may be told while the children study the pictures. Then they may write the answers for the examples.

One day 9 egrets were eating fish in a stream. One more egret came. Then how many egrets were eating?

One pelican was standing on a post. Nine more pelicans came. Then how many pelicans were standing on posts?

Ten grouse were on the ground. Nine of them flew away. Then how many grouse were on the ground?

Ten pheasants were eating. One pheasant flew away. How many pheasants were eating then?

Have the children study the picture of feathers and state the new facts. Then have them read the directions and write the facts.

Follow-up Activities

Additional learning helps. If the teacher finds that some of the children need more help with the four new facts, additional stories may be given them to dramatize. It may be that the children can make stories that use the facts if the teacher works with them. They may work out the facts again with counting objects. Then they should write the facts. Perhaps each child can make an illustrated study and practice card for the facts.

The plan pictured in the next column may be used for the card:

Front

$$\begin{array}{r} 9 \\ +1 \\ \hline \end{array} \quad \begin{array}{r} 1 \\ +9 \\ \hline \end{array} \quad \begin{array}{r} 10 \\ -\ 9 \\ \hline \end{array} \quad \begin{array}{r} 10 \\ -\ 1 \\ \hline \end{array}$$

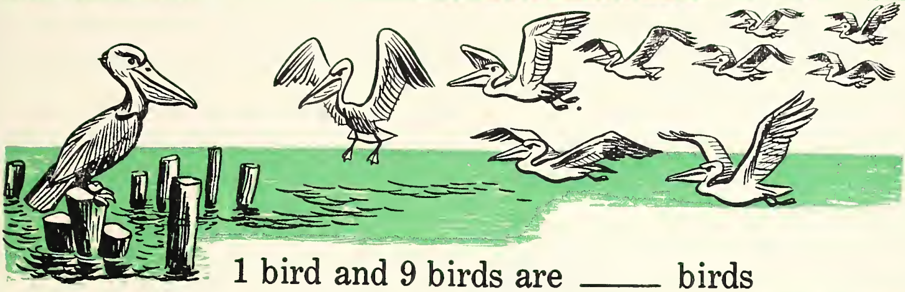
Back

$$\begin{array}{r} 9 \\ +1 \\ \hline 10 \end{array} \quad \begin{array}{r} 1 \\ +9 \\ \hline 10 \end{array} \quad \begin{array}{r} 10 \\ -\ 9 \\ \hline 1 \end{array} \quad \begin{array}{r} 10 \\ -\ 1 \\ \hline 9 \end{array}$$

Enrichment activities. The children who are making the sets of cards for the game table may add cards for the new facts. Those who are charting the facts may add the four new facts.

9 birds and 1 bird are ____ birds

9 birds
+ 1 bird
____ birds



1 bird and 9 birds are ____ birds

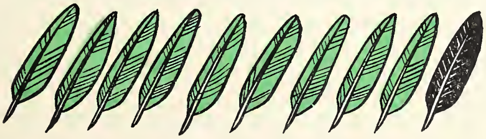
1 bird
+ 9 birds
____ birds

9 birds from 10 birds is ____ bird

10 birds
− 9 birds
____ bird

1 bird from 10 birds is ____ birds

10 birds
− 1 bird
____ birds



Four facts have 9, 1, and 10
in them. Write the four facts.

+ ____

+ ____

− ____

− ____

USING ADDITION AND SUBTRACTION IN NUMBER STORIES AND EXAMPLES

Preparatory Activities

The number stories and the examples on page 97 use recently learned addition and subtraction facts, and include the comparison concept of subtraction as well as simple addition and subtraction examples and column addition examples.

Reading number stories orally. The following stories may be written on the blackboard to be read orally and solved:

Some of the children went to the farm last week. Seven children went in a bus and 4 went in a car. How many more children went in the bus than in the car?

The children saw 3 black lambs and 5 white lambs on the farm. How many lambs did they see in all?

The farmer had 9 baby ducks. He gave 1 duck to the children for a pet. How many ducks did he have left?

The children saw 2 cows in the barn and 5 cows in a field. How many cows did they see in all?

There may be words in the number stories in the pupil's book which are new to the children. Such words should be introduced before the stories are read.

Using Page 97

A discussion of the picture should make clear that the girl, Ruth, is in a garden. With this background, the children are ready to read the stories silently and find the answers. As on previous pages of this kind, only the answer is written.

The children may then read the directions and find the answers for the examples. The teacher should remind them to begin at the top and add down in both the column addition examples and the other addition examples.

Follow-up Activities

Second grade is not too early to have the children begin to evaluate their own work. They need to be encouraged to take responsibility for their own learning and to understand which things are easy for them to learn and which require more effort.

The group may discuss the answers for the number stories and examples. Each child should check his own answers and circle those that are incorrect. Then a quick check can be made to see how many children got each story and example right.

If the idea is stressed from the very first that we check to find which things we still have to learn, the children will develop a respect for honest, careful checking. The teacher will, of course, look over the children's work to make sure that they made no mistakes in checking.

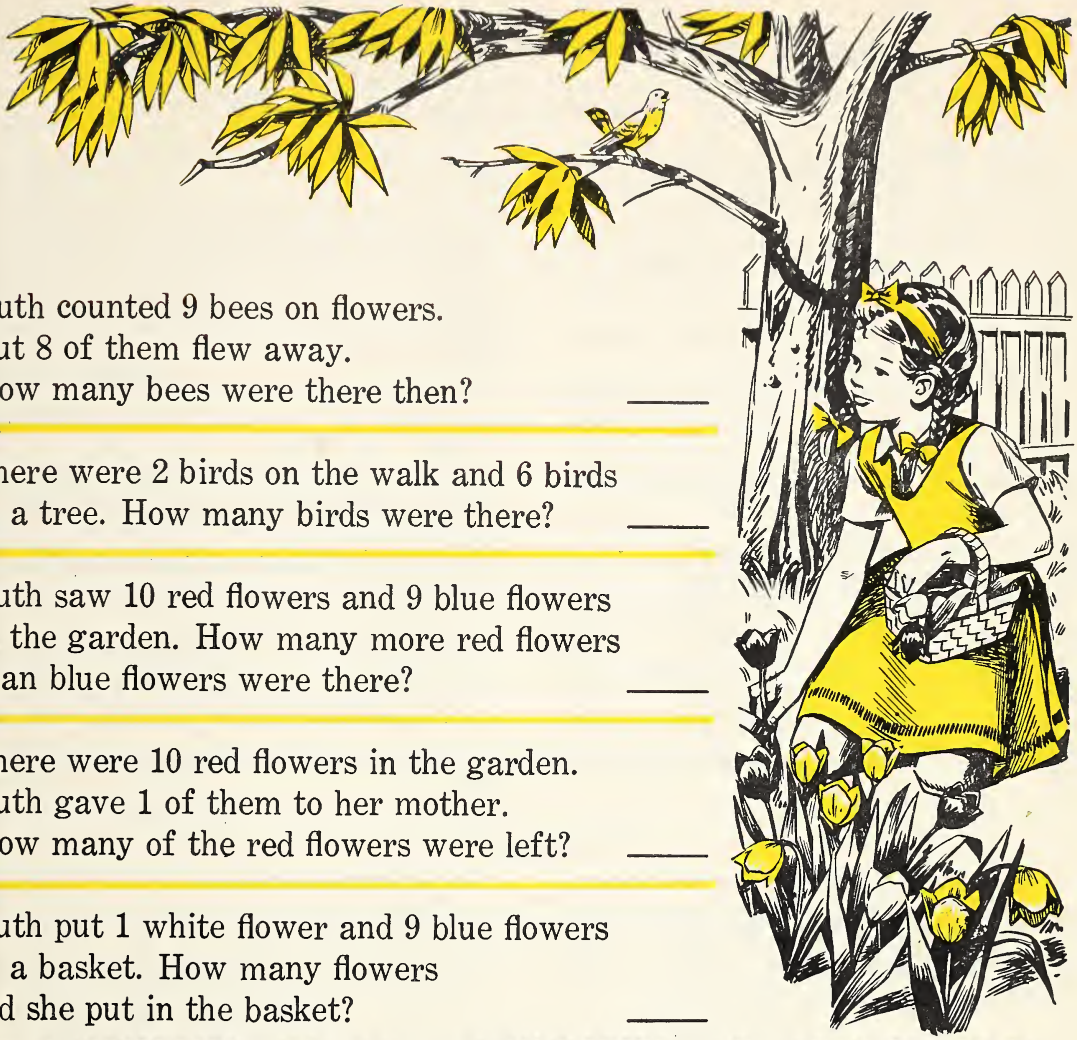
Additional learning helps. The teacher will work with the children who had difficulty in reading and understanding the number stories. She will help those who missed facts to find which facts they missed, to work out the answers concretely, and to study the facts on their study cards.

If more practice is needed in column addition, these examples may be added to the list of supplementary examples provided earlier:

1	2	1	4	2	3	3	5	1	8
2	1	4	1	3	2	5	3	8	1
5	5	3	3	3	3	1	1	1	1

Enrichment activities. The faster learners who are making the sets of number story cards may make cards with stories that use each of the new facts.

Perhaps some of these children can work with the slower learners. Often a plan of pairing the children—a faster and a slower child in a pair—brings about good human relations and is mutually helpful.



Ruth counted 9 bees on flowers.
But 8 of them flew away.
How many bees were there then? ____

There were 2 birds on the walk and 6 birds in a tree. How many birds were there? ____

Ruth saw 10 red flowers and 9 blue flowers in the garden. How many more red flowers than blue flowers were there? ____

There were 10 red flowers in the garden.
Ruth gave 1 of them to her mother.
How many of the red flowers were left? ____

Ruth put 1 white flower and 9 blue flowers in a basket. How many flowers did she put in the basket? ____

Add or subtract, and write the answers.

8	10	3	8	10	1	8	5	8	9
− 3	− 9	+ 5	− 2	− 1	+ 9	− 6	+ 3	− 5	+ 1

1	8	1	4	3	2	1	3	2	4
1	1	2	1	3	3	8	1	1	1
2	1	2	3	2	3	1	2	5	1

WORKING WITH GROUPS OF SEVEN, TWO, AND NINE

Preparatory Activities

Again, experiences with groups are provided so that the children's understanding of the number 9 will be extended and they will be prepared for the introduction of the next new unit of addition and subtraction facts.

Using concrete objects. These preparatory procedures are suggested:

Arrange on the bulletin board or the blackboard a group of 7 pictures and below them another group of 2 pictures which the children have cut from magazines for the arithmetic game table. Try to have 2 pictures of one subject, such as fruit, and seven of another subject, such as children.

Have the children find how many pictures are at the top of the bulletin board, how many are at the bottom, and how many there are in all. Then have them tell how many have fruit in them, how many have children in them, and how many pictures there are in all.

Move the pictures to make one group of 9. Have the children find how many pictures there are. Ask how many pictures have children in them and how many have not.

Have the children tell again how many pictures there are in all. Then ask how many pictures have fruit in them and how many have not.

These directions may be given as the children build the groups with their counting objects:

Put 7 counters on your desk. Now put 2 more near them. How many counters did you put on the desk?

Put 2 more counters on your desk. Now put 7 more near them. How many did you put on the desk this time?

Put 9 counters on your desk. Move 7 of them to the left. How many are at the right?

Put 9 more counters on your desk. Move 2 of them to the left. How many are at the right?

Using Page 98

Discussion of the picture should bring out the fact that some clocks are on the shelf above, and some on the shelf below. Then the children may read the questions and study the pictures to find the answers.

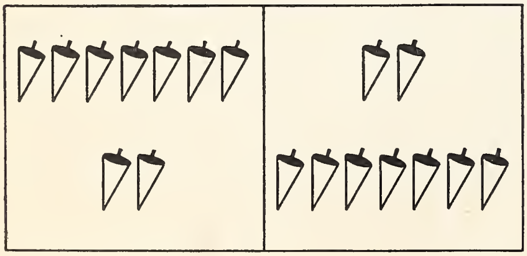
The children should have no difficulty drawing glasses, such as are shown here.

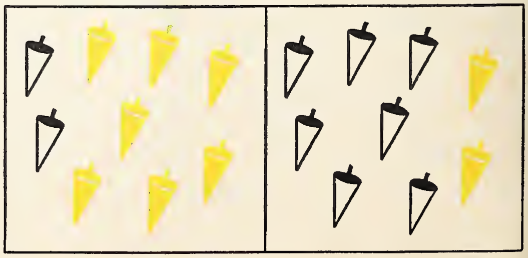
Then they may read the questions below, and study the pictures to find the answers.

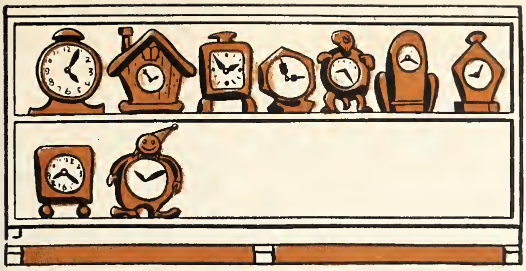
Follow-up Activities

Additional learning helps. If some children seem to need more experiences with groups of 7, 2, and 9, the teacher may help them first with large objects such as chairs or books. Then they may build the groups again with their counters. Finally they may make illustrated cards as shown below.

Enrichment activities. The children who do not need more experiences with groups of 7, 2, and 9 may choose an activity for this time. They may use materials from the arithmetic table. If some of them wish to do so, they may make illustrated cards for the new groups to put on the arithmetic table.



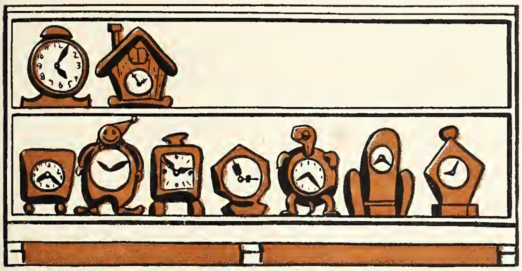




How many clocks are above? ______

How many are below? ______

How many clocks are there? ______



How many clocks are above? ______

How many are below? ______

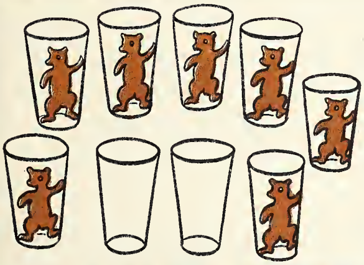
How many clocks are there? ______

Draw 7 glasses.

Then draw 2 more glasses. ______

Draw 2 glasses.

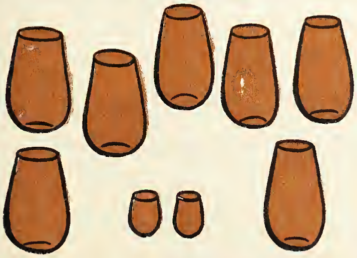
Then draw 7 more glasses. ______



How many glasses are there? ______

How many have bears on them? ______

How many have no bears on them? ______



How many glasses are there? ______

How many are little? ______

How many are big? ______

LEARNING FOUR NEW FACTS

Preparatory Activities

The four new facts are presented on page 99 with pictures which illustrate oral stories to be told by the teacher.

Dramatization. Stories planned by the teacher from actual classroom activities may be dramatized. If such stories are not used, these may be dramatized:

The second grade made a doll house for the children in the kindergarten. The boys brought 7 large boxes and 2 small boxes for the doll house. How many boxes did the boys bring in all?

The girls brought 2 large boxes and 7 small boxes. How many boxes did the girls bring in all?

The boys brought 9 boxes. They used 7 of them to make chairs for the doll house. How many boxes did the boys have left?

The girls brought 9 boxes. They used 2 of them to make beds for the doll house. How many boxes did the girls have left?

These directions may be given while the children illustrate the new facts with their counters:

Put 7 counters on the desk. Put 2 more counters near them. How many are 7 and 2?

Put 2 more counters on the desk. Put 7 more with them. How many are 2 and 7?

Put 9 more counters on the desk. Move 7 of them away. How many are left when you take 7 from 9?

Put 9 more counters on the desk. Move 2 of them away. How many are left when you take 2 from 9?

Look at the counters on your desk and say the new facts.

Using Page 99

As the children look at the pictures they will discover that these stories are about cowboys. Have them study the pictures and write the answers for the examples as the teacher tells these stories:

Seven cowboys were sitting by the campfire. Two more cowboys came. Then how many cowboys were around the campfire?

Two cowboys got their blankets and went to sleep. Soon 7 more went to sleep. How many cowboys were sleeping then?

Nine cowboys were sleeping. Seven of them woke up and went away. How many cowboys were sleeping then?

Nine cowboys were getting ready to ride the range. Two cowboys got on their ponies and rode away. How many cowboys were still at camp?

Have the children study the composite picture at the bottom of the page and use it to state the new facts. Then they may read the directions and write the facts.

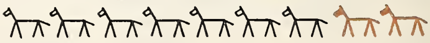
Follow-up Activities

Additional learning helps. Any children who had trouble may be helped to use the facts in stories which can be dramatized. Then they may illustrate the facts with their counting objects, and write them. They may also make illustrated study and practice cards for the facts, like the card shown below.

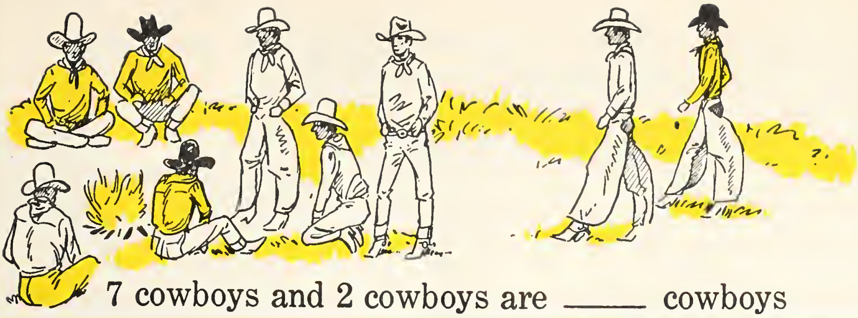
Front

$\begin{array}{r} 7 \\ +2 \\ \hline \end{array} \quad \begin{array}{r} 2 \\ +7 \\ \hline \end{array} \quad \begin{array}{r} 9 \\ -7 \\ \hline \end{array} \quad \begin{array}{r} 9 \\ -2 \\ \hline \end{array}$

Back

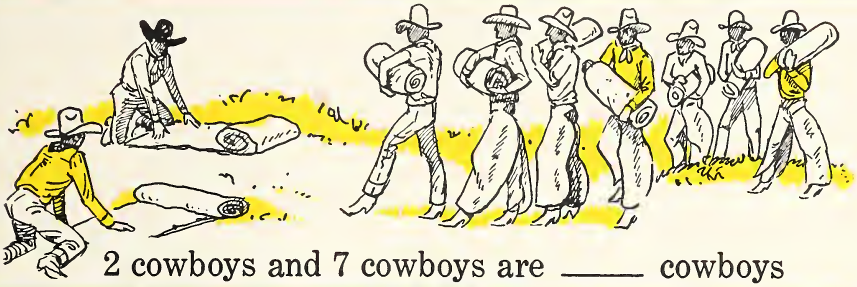


$\begin{array}{r} 7 \\ +2 \\ \hline 9 \end{array} \quad \begin{array}{r} 2 \\ +7 \\ \hline 9 \end{array} \quad \begin{array}{r} 9 \\ -7 \\ \hline 2 \end{array} \quad \begin{array}{r} 9 \\ -2 \\ \hline 7 \end{array}$



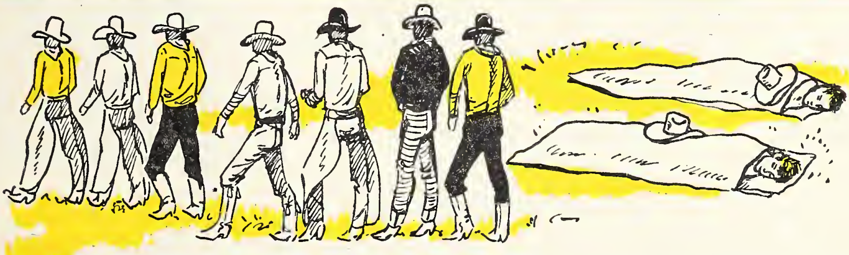
7 cowboys and 2 cowboys are ____ cowboys

7 cowboys
+ 2 cowboys
____ cowboys



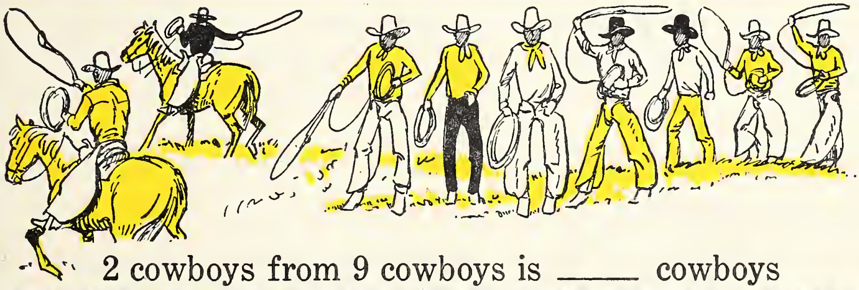
2 cowboys and 7 cowboys are ____ cowboys

2 cowboys
+ 7 cowboys
____ cowboys



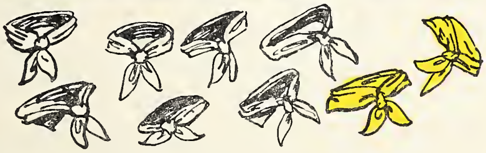
7 cowboys from 9 cowboys is ____ cowboys

9 cowboys
− 7 cowboys
____ cowboys



2 cowboys from 9 cowboys is ____ cowboys

9 cowboys
− 2 cowboys
____ cowboys



Four facts have 7, 2, and 9 in them. Write the four facts.

+ ____   + ____   − ____   − ____

USING ADDITION AND SUBTRACTION IN NUMBER STORIES AND EXAMPLES

Preparatory Activities

Included in the number stories on page 100 are two that give practice in finding how many more are needed. Recently learned facts are used on this page.

Reading number stories orally. The following stories may be read orally from the blackboard and discussed or illustrated, if the teacher does not find it possible to use stories growing out of classroom experiences.

The boys are planning a toy parade. Tom wants 8 wagons for the parade. He has made 2 wagons. How many more does he need?

Bob made 5 big flags and 3 little flags for the parade. How many flags did he make in all?

Tom needs 8 clowns to ride in the wagons. He has 7 clowns. How many more clowns does Tom need?

John brought 1 animal for the parade and Fred brought 9. How many animals will they have in the parade?

Before the children are asked to read the number stories on page 100, the teacher will wish to introduce any words that may cause reading difficulty.

Using Page 100

An examination of the picture and a discussion of it will lead to the understanding that the boys are making houses for their toy animals. Perhaps some of the children in the group have small plastic animals such as those envisioned in the stories. The children may read the stories silently and find the answers.

Then they may read the directions and find the answers for the examples.

Follow-up Activities

The teacher may help the children find which stories were easy and which caused difficulty as they evaluate their own work. The same may be done with the examples. This will help each child find what his relearning job is. Those who did well will develop a wholesome pride in good work.

Additional learning helps. If there are children in the group who need help in problem solving, they may be given some number stories similar to those in their book to read and think through. The teacher will wish to ask guiding questions and help them get at the problem situation in each story. Sometimes this will be a matter of retelling the story, rereading the question, or making pictures to illustrate the situation.

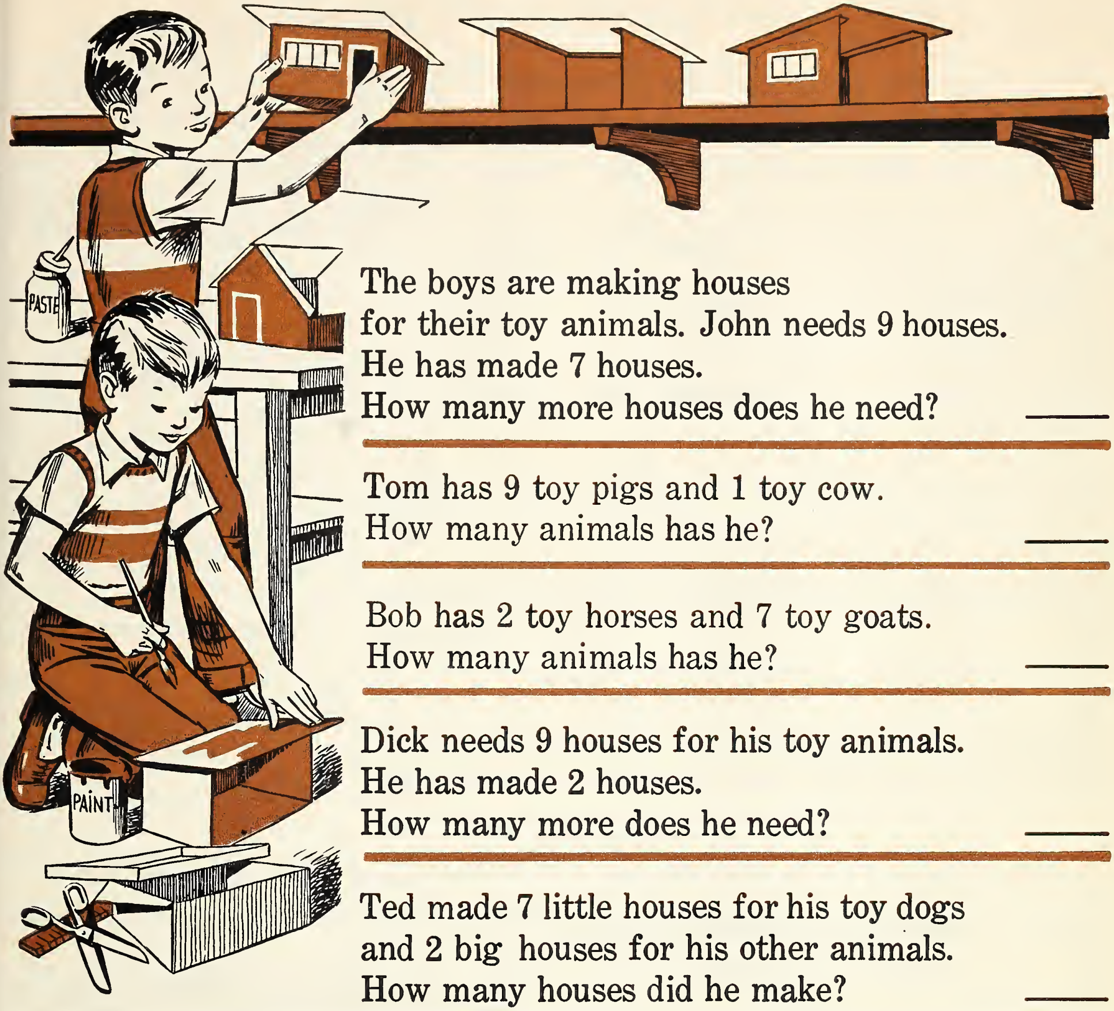
If help is needed on facts, each child who made mistakes should be helped to find which facts caused him trouble. Then he should work out the answers with counting objects. He may then find the study and practice cards for the facts he missed and study them.

If more practice is needed in column addition, these examples may be added to the supplementary list provided earlier in the guide and used in an exercise.

$$\begin{array}{ccccccccc}
2 & 7 & 1 & 1 & 6 & 2 & 5 & 3 & 4 \\
7 & 2 & 1 & 6 & 1 & 5 & 2 & 4 & 3 \\
\underline{1} & \underline{1} & \underline{7} & \underline{2} & \underline{2} & \underline{2} & \underline{2} & \underline{2} & \underline{2}
\end{array}$$

Enrichment activities. The children who do not need help at this time may choose other things to do. Those who are making the set of number story cards for the arithmetic table may make a card for each of the new facts. The card should use the fact in a story.

Perhaps there is a need to measure and cut paper for arithmetic cards. Some children may use rulers to measure the paper, and cut it.



The boys are making houses for their toy animals. John needs 9 houses. He has made 7 houses.
How many more houses does he need? ____

Tom has 9 toy pigs and 1 toy cow.
How many animals has he? ____

Bob has 2 toy horses and 7 toy goats.
How many animals has he? ____

Dick needs 9 houses for his toy animals.
He has made 2 houses.
How many more does he need? ____

Ted made 7 little houses for his toy dogs and 2 big houses for his other animals.
How many houses did he make? ____

Add or subtract, and write the answers.

9	10	2	9	10	7	1	9	9	9
−1	−9	+7	−8	−1	+2	+9	−7	+1	−2

3	2	3	1	1	2	5	1	6	2
4	1	5	6	1	7	3	1	2	5
2	1	1	2	1	1	1	7	1	2

WORKING WITH GROUPS OF THREE, SIX, AND NINE

Preparatory Activities

The next experiences with groups are provided on page 101 for the purpose of extending the children's understanding of the number 9 and to prepare them for the introduction of a new learning unit of addition and subtraction facts.

Using concrete objects. Realistic experiences with groups may be given first, to enable the children to discover the groups. Then the children may build the groups with concrete objects.

Facing the class and holding 6 red crayons in her right hand and 3 blue crayons in her left hand, the teacher may extend the right hand and ask how many crayons are in it. Then she may do the same with the left hand, and finally ask how many there are in all.

Then she may ask how many blue crayons there are, how many red crayons there are, and, again, how many crayons there are in all.

She may hold the 9 crayons together and ask how many there are. Then she may move 6 of them to the left and ask how many are in that hand and how many in the other.

Then she may hold the 9 crayons together again. After the children tell how many there are, she may move 3 crayons to the left, and ask how many are in that hand and how many in the other.

The following directions may be given as each child builds the groups with his counting objects:

Place on the desk 6 counters. Place 3 more near them. How many counters are on the desk?

Now place 3 more counters on the desk. Place 6 more near them. How many counters are there this time?

Now place 9 more counters on the desk. Move 6 of them to the left. How many counters are at the right?

Place 9 more counters on the desk. Move 3 of them to the left. How many counters are at the right?

Using Page 101

Help the children discover that in the pictures at the top of the page some eggs are in a basket, some are in a nest, and some are in a box. Then the children may study the pictures and answer the questions.

Have them draw the eggs as they are directed. The eggs may be as interesting as they care to make them. The children may follow the suggestions given here, or they may use their own ideas.

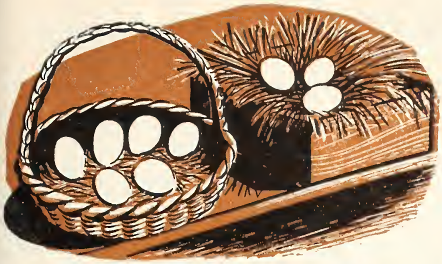
They may then study the pictures at the bottom of the page and answer the questions.

Follow-up Activities

Additional learning helps. The teacher will know which children, if any, need more experiences with groups before they attempt to learn the new addition and subtraction facts. These children may be given experiences in observing large realistic objects grouped as 3 and 6 or as 6 and 3. Then they may build the groups again with their counting objects, following the plan suggested under preparatory activities.

The children may then make cards and draw pictures to illustrate the groups. They may use their own ideas, or follow the ideas suggested for previous cards.

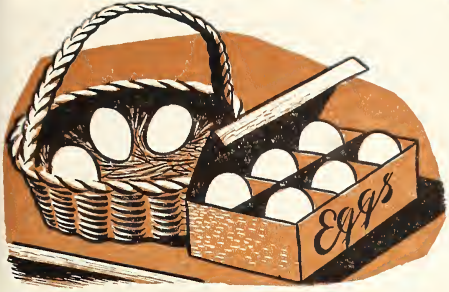
Enrichment activities. The children who do not need help from the teacher at this time may choose other work. Perhaps some of them will wish to play a game of recognizing groups with the cards on the arithmetic table. Others may wish to make an illustrated card showing the four groups they have just studied. The cards may be added to the set on the game table for use by the less able pupils.



How many eggs are in the basket? ____

How many are in the nest? ____

How many eggs are there? ____



How many eggs are in the basket? ____

How many are in the box? ____

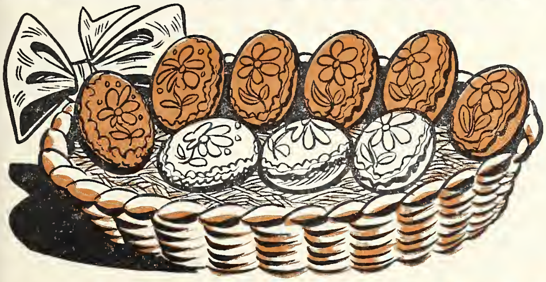
How many eggs are there? ____

Draw 6 eggs.

Then draw 3 more eggs. ____

Draw 3 eggs.

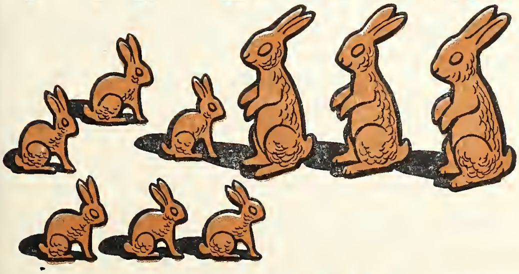
Then draw 6 more eggs. ____



How many eggs are there? ____

How many are brown? ____

How many are white? ____



How many rabbits are there? ____

How many are big? ____

How many are little? ____

LEARNING FOUR NEW FACTS

Preparatory Activities

Pictures which illustrate oral stories are used on page 102 to introduce two new addition facts and two new subtraction facts.

Dramatization. These stories may be told by the teacher for the children to dramatize:

The children made a reading corner in their room at school. They had a book shelf, a table, and some chairs in the corner.

Sue put 6 books on the shelf. Then Ann put 3 more books on the shelf. How many books were on the shelf then?

Three boys were reading at the table. Six more boys came to read. How many boys were reading in all?

The girls put 9 books on the shelf. The boys took 6 of the books to read. How many books were left on the shelf?

The boys put 9 pictures up in the reading corner. Three of the pictures came down. How many pictures were hanging on the wall then?

After the new facts are written on the blackboard, each child may build them with his counting objects. These directions may be given:

Put 6 counters on the desk. Put 3 more counters near them. How many are 6 and 3?

Put 3 more counters on the desk. Put 6 more counters near them. How many are 3 and 6?

Now put 9 counters on the desk. Move 6 of them away. How many are left when you take 6 from 9?

Put 9 more counters on the desk. Move 3 of them away. How many are left when you take 3 from 9?

Look at the counters on the desk and say the four new facts.

Using Page 102

After the children have talked about the pictures, tell them these stories and let them write the answers for the examples:

One day some children were watching the monkeys. Six monkeys were on the ground eating lunch. Three more monkeys came to eat. How many monkeys were eating then?

Three monkeys were playing in a tree. Six more monkeys came to play. How many monkeys were in the tree then?

The 9 monkeys were playing in the tree. But 6 of them got tired and came down. How many monkeys were in the tree then?

There were 9 monkeys eating bananas. Three of the monkeys went away. How many monkeys were eating bananas then?

Have the children look at the composite picture of bananas and state the new facts. Then have them read the directions and write the facts.

Follow-up Activities

Additional learning helps. Some of the children may need more work with the new facts before they are able to use them in number stories and examples. The teacher may help these children to make up other number stories that use the facts.

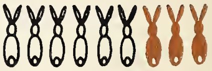
After they dramatize the stories, the children may build the facts with their counting objects, and then write them three or four times.

These children will probably need to make study and practice cards like the card shown in the next column.

Front

$$\begin{array}{r}6\\+3\\\hline\end{array}\quad\begin{array}{r}3\\+6\\\hline\end{array}\quad\begin{array}{r}9\\-6\\\hline\end{array}\quad\begin{array}{r}9\\-3\\\hline\end{array}$$

Back

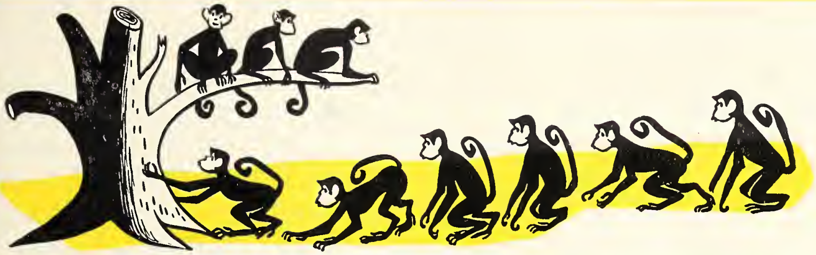


$$\begin{array}{r}6\\+3\\\hline 9\end{array}\quad\begin{array}{r}3\\+6\\\hline 9\end{array}\quad\begin{array}{r}9\\-6\\\hline 3\end{array}\quad\begin{array}{r}9\\-3\\\hline 6\end{array}$$

Enrichment activities. The children who do not need help may record the new facts or make separate cards for the facts.

6 monkeys
+ 3 monkeys
____ monkeys

6 monkeys and 3 monkeys are ____ monkeys



3 monkeys
+ 6 monkeys
____ monkeys

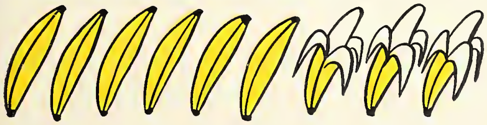
3 monkeys and 6 monkeys are ____ monkeys

9 monkeys
− 6 monkeys
____ monkeys

6 monkeys from 9 monkeys is ____ monkeys

9 monkeys
− 3 monkeys
____ monkeys

3 monkeys from 9 monkeys is ____ monkeys



+ ____

+ ____

− ____

− ____

Four facts have 6, 3, and 9 in them. Write the four facts.

USING ADDITION AND SUBTRACTION IN NUMBER STORIES AND EXAMPLES

Preparatory Activities

The number stories on page 103 help to maintain the pupil's skill in using the subtraction concept of finding how many more are needed and in using simple addition. The new addition and subtraction facts are used in the stories and the examples.

Oral problem solving. The following number stories, or similar stories, may be written on the blackboard for use in a directed oral lesson in problem solving. This should precede the silent reading of the stories in the pupil's book.

The children want to play circus. They need 7 chairs to make a tent. They have 6 chairs. How many more do they need?

They have 8 big pieces of paper for the tent. They need 5 pieces. They have more pieces than they need. How many more?

Two girls and 6 boys want to be clowns. How many clowns will there be in the circus?

Nine girls are needed for circus dancers. Three girls want to be dancers. How many more girls are needed?

The children will read and discuss the stories. It may help if they tell what each question asks after they read it, since some of the questions help them understand the situations. They may reread the stories if they have trouble finding the answers.

The teacher will wish to look over the stories in the pupil's book to anticipate words that may cause difficulty.

Using Page 103

The children will wish to find what the stories are about by looking at and discussing the pictures. Then they may read the stories and find the answers, working independently. The teacher will watch for indications that individual children need help, and give the help.

When the stories have been read and the answers written, the children may find the answers for the examples.

Follow-up Activities

The children may evaluate their work by finding which stories caused trouble, which examples they missed, and the things they need to do. The teacher will supervise this period carefully to see that they check their work correctly, and to give commendation when it is deserved.

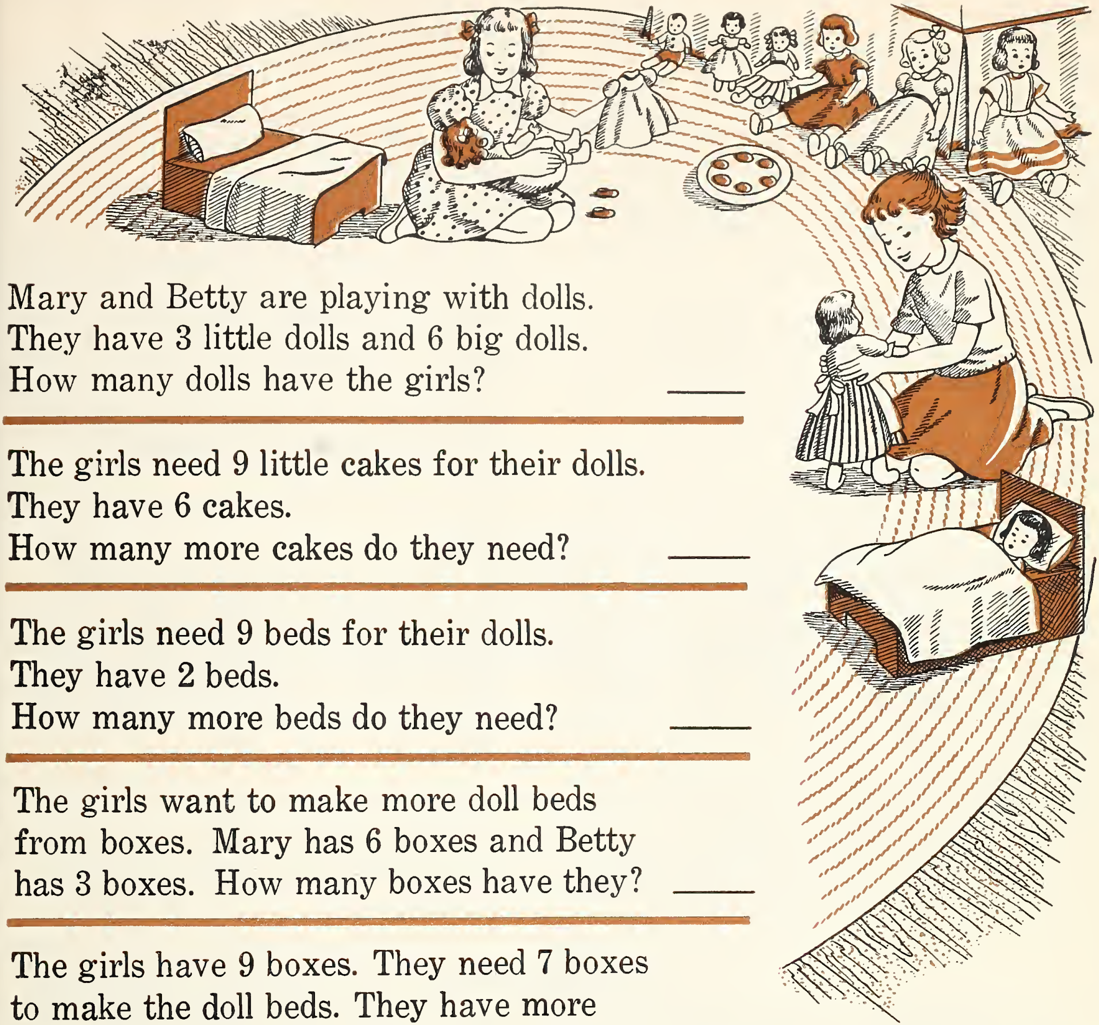
Additional learning helps. The teacher will wish to work with the children who need help, if there are any. Help in solving problems can probably be given best by analyzing with the children the particular stories that caused trouble. Then the teacher may sort out some of the number story cards on the arithmetic table and have these children read the stories and find the answers.

The children who need help with addition and subtraction facts may use their counting objects to build the specific facts they missed. Then they may study their illustrated cards. Finally, they may write the facts.

Enrichment activities. The children who do not need the teacher's help at this time may choose work to do. If they wish to do so, they may use some of the games or other material on the game table.

Those children who are making number story cards for the arithmetic table may make cards with stories that use the new facts.

Some of the children may use the bundles of counting sticks to show what two-place numbers mean. This activity is timely now because the addition of two-place numbers will be introduced soon. The meaning of numbers will be used to help explain the process.



Mary and Betty are playing with dolls.
They have 3 little dolls and 6 big dolls.
How many dolls have the girls? ______

The girls need 9 little cakes for their dolls.
They have 6 cakes.
How many more cakes do they need? ______

The girls need 9 beds for their dolls.
They have 2 beds.
How many more beds do they need? ______

The girls want to make more doll beds from boxes. Mary has 6 boxes and Betty has 3 boxes. How many boxes have they? ______

The girls have 9 boxes. They need 7 boxes to make the doll beds. They have more boxes than they need. How many more? ______

Add or subtract, and write the answers.

9	1	8	2	9	3	8	6	7	1
− 2	+ 9	− 3	+ 6	− 3	+ 5	− 6	+ 3	− 2	+ 8
8	3	9	1	8	2	9	7	7	5
− 2	+ 6	− 7	+ 7	− 5	+ 7	− 6	+ 2	− 3	+ 3

MEASURING BY THE FOOT, YARD, AND INCH

Preparatory Activities

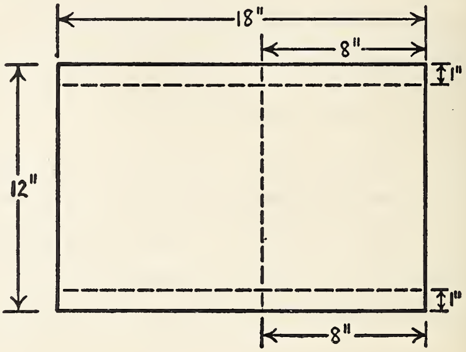
The exercise on page 104 will give an opportunity for maintenance of skill in measuring by the inch. Number stories which give practice in using inches in situations similar to those met in actual experience are provided also.

Measuring real things. The children may first examine a foot ruler and a yardstick and read the number of inches and feet. Then they may use them to measure lines on the blackboard, the height of their desks, the width of the windows, etc.

A basic concept in measuring by the inch is that it is one inch from the left end of the ruler to the line by the 1 on the ruler, that it is one inch from the 1 to the 2, etc. This can best be developed by having each child find 1 inch, then 2 inches, etc., on the ruler. Ideally, the rulers used for this purpose should have on them only the 1-inch marks.

Another basic concept is understanding the way we use a ruler to measure by the inch, both to find how long things are and to make things a specified length.

Suggest to the children that they make an envelope to keep their addition and subtraction cards in. Give the children pieces of art paper or wrapping paper, 12″ x 18″. Have them make a mark on each long side, 8 inches from one end of the paper. Have them draw a line across the paper connecting these marks. Then have them draw lines 1 inch inside the edge of the paper on each long side, fold the paper on these lines, and then fold it on the 8-inch line. Finally, have them paste the side edges together to make the pocket. The envelope can be hung on the wall with thumbtacks, or the top can be folded over to make a flap to close the envelope.



Using Page 104

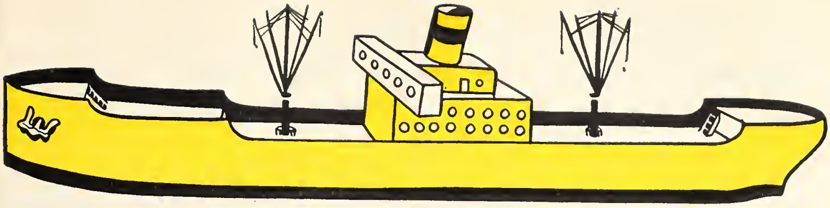
Have the children measure the things in the pictures and write the numbers that tell how long they are.

Point out that the first two number stories are about the pictures above. Let them read the stories and find the answers. Then let them prove the answers to the first two stories by measuring. They may make pictures to prove the answer for the third story if they wish.

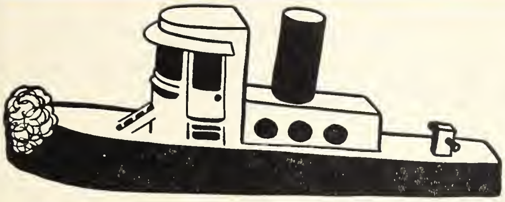
Follow-up Activities

Additional learning helps. The children who need help may have more practice in measuring things about the room with the foot ruler and the yardstick. Then they may have practice in measuring by the inch to make something which seems worthwhile to them. For example, they may make a cardboard picture frame for one of the pictures they have made in art, social studies, science, or reading.

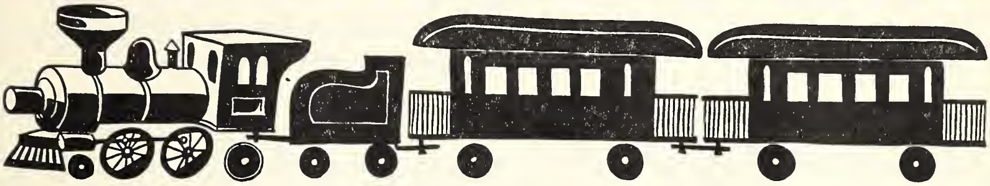
Enrichment activities. The faster learners may enjoy a more complicated assignment in measuring. They may find how many feet long the classroom is. Then they may find how many yards long it is, and how many feet over, if it is not an even number of yards. They may be asked to measure and cut strips of wrapping paper the right size for use in art on the easel or for large pictures in social studies or science.



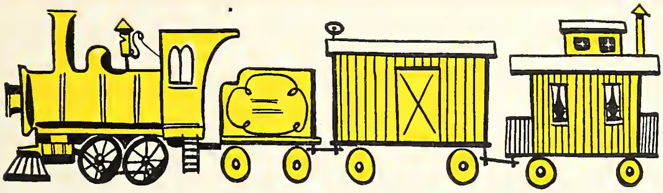
____ inches long



____ inches long



____ inches long



____ inches long

The yellow boat is 5 inches long.
The black boat is 3 inches long.
How much longer is the yellow boat? ____ inches

The black train is 6 inches long.
The yellow train is 4 inches long.
How much longer is the black train? ____ inches

Mary has a doll bed 9 inches long.
Her doll is 3 inches long.
How much longer is the bed than the doll? ____ inches

MAINTENANCE OF FRACTIONS; MAKING SURE OF ADDITION AND SUBTRACTION FACTS

Preparatory Activities

The exercises on page 105 maintain skill in recognizing halves and fourths and in using the terms. The fifth in the series of "Making Sure" tests, which occurs on this page also, covers the most recently introduced addition and subtraction facts, and includes column addition examples.

Using concrete materials. The concrete materials related to the fractions *one-half* and *one-fourth,* which have been assembled on the arithmetic table, may be used to refresh the memory of the children before they do the exercises in their book. Drawings on the blackboard will also be useful.

Using Page 105

Call attention to the pictures at the top of the page. Then tell the children to put an X on each piece that is one-half. Tell them to look at the pictures again and put a √ on each piece that is one-fourth.

The children are to read the sentences below the picture and circle the answers to the questions.

Then the children may read the directions and write the answers for the examples.

Follow-up Activities

Additional learning helps. Some children may need more experiences with concrete objects to clarify their ideas. After they get the idea that there must be two halves in a whole and four fourths in a whole, the best way to develop the concept of equality of pieces is to let them try to cut such things as apples, papers, string, or pieces of bread into halves and then into fourths.

The teacher will wish to examine the children's work in addition and subtraction very carefully to find how many of the facts and which facts need further attention by individuals and by the entire group. She will need to know which facts should be presented again to the whole group and which facts caused difficulty for some of the children only.

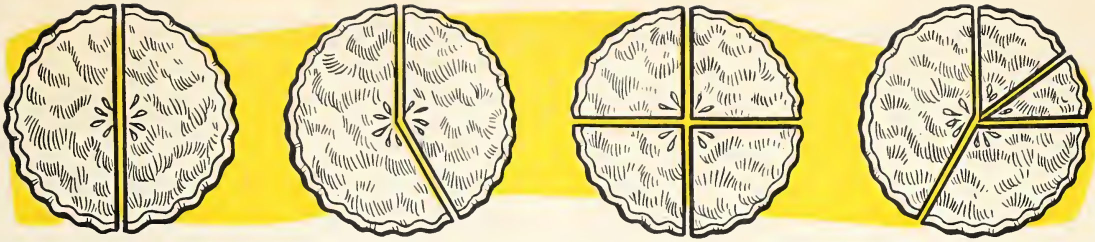
Two types of records will be needed. The first record will consist of a tabulation, fact by fact, of all the mistakes made. The second record will be one which records individual mistakes.

When these records are complete, all those who need more help may be brought together for work on the elements that caused all of them trouble. Then small groups or individuals may be given the specific help which they need.

If facts were missed, the children who missed them must retrace learning steps and have another opportunity to learn before they are ready for practice. This means using concrete materials to find the answers, using pictured materials to show the answers, and writing the examples with the answers several times.

After each child is given the list of facts he missed, he can use his concrete objects, and the illustrated study cards which he has made, to learn the facts. As the children work with the facts, the teacher can supervise them and give individual help. This teach, practise, test, reteach plan should bring the desired results finally, even for the slower learners.

Enrichment activities. The children who need no help at this time may work with some of the materials or games on the arithmetic table. Perhaps they can add to the collection of pictures from magazines which show ways in which fractions are used. Some children may be interested in making matching games for fractions. They may cut several paper pie plates, or squares, circles, etc., of colored paper, into halves and fourths. These fractional parts of things may be put on the game table for later use.



Mary has cut a pie into 2 pieces.
Each piece is just as big as the other.
What is each piece called?

one-half **one-fourth**

Ruth has cut a pie into 4 pieces.
Each piece is just as big as the others.
What is each piece called?

one-half **one-fourth**

Add or subtract, and write the answers.

9	6	7	1	8	6	10	4	9	1
− 3	+ 1	− 4	+ 9	− 3	+ 3	− 1	+ 4	− 7	+ 6
9	2	8	3	10	7	9	8	2	10
− 1	+ 5	− 4	+ 6	− 5	+ 1	− 6	− 2	+ 7	− 9
7	5	9	8	3	7	8	2	9	8
− 1	+ 5	− 2	− 6	+ 5	− 6	− 5	+ 6	− 8	− 7
1	7	3	3	5	1	5	2	4	3
5	2	2	1	2	2	1	4	3	6
3	1	3	1	2	6	2	3	2	1

LEARNING TO ADD AND SUBTRACT LARGER NUMBERS

The children have developed an understanding of simple addition and subtraction and of column addition. Learning to add and subtract two-place numbers should come as only an extension of something they already know. In this section of the pupil's book, the addition of two two-place numbers with sums not to exceed 99, and the subtraction of two-place numbers from two-place numbers with minuends not to exceed 99 will be introduced.

In *Making Sure of Arithmetic*, *Books One* and *Two*, the addition process is introduced and carefully developed before the introduction of the subtraction process is made. This plan enables the child to gain security in one new process at a time. Then, after both processes are thoroughly understood, and the child is secure in using them separately, the relationships between the processes are developed in Grade Two.

In keeping with this plan, the addition of two-place numbers will be introduced and carefully developed. Then the subtraction of two-place numbers will be introduced and developed. Finally, the two processes will be brought together to show the relationships between them.

Much has been done in the Grade Two program to prepare the children for the new work which is to follow. The children have developed a functional understanding of both processes. They should know, not only *how* to add and subtract, but also *when* and *why* we add or subtract.

There has already been much emphasis on the meaning of numbers, and work with two-place numbers. This background will enable the children to understand why we write the examples with ones under ones and tens under tens when they approach these new steps. It will also enable them eventually to understand why we begin at the right to add or subtract in examples with two-place numbers. Thus the processes can be learned meaningfully, and not just mechanically.

The suggestions to the teacher, as well as the materials in the pupil's book, will indicate the ways in which it will be possible to capitalize upon the things the children know about numbers as the new processes are introduced. As in other phases of the work, concrete experiences will be suggested as a means of developing understanding together with skill in adding and subtracting two-place numbers.

It will be noticed that none of the examples with two-place numbers have zeros in them. In the *Making Sure of Arithmetic* series, zero is treated meaningfully. The children are helped to develop the generalization that zero in a number means that there is nothing in that place to add or subtract. Therefore, they do not memorize the so-called "zero facts" in addition and subtraction. Since children in Grade Two are not far enough advanced in the learning sequence of arithmetic for the introduction of the generalization about zero, all examples with zero are omitted from the development in this grade.

As was suggested in the discussion of column addition, children in the group who are immature, who learn slowly, and who may be having difficulty in understanding simple addition and subtraction or in distinguishing between the two processes should not be given the work in the addition and subtraction of two-place numbers. These steps will be introduced and thoroughly retaught in Grade Three. Therefore, the slower learners, if there are any in the group, may omit these steps without interfering with their sequence of development and learning in arithmetic. These children may devote their time to simple addition and subtraction while the faster learners go right on with the new learning steps.

Four more learning units of addition and subtraction facts will be introduced in this section of the pupil's book. This will complete the introduction of the 45 addition facts with sums of 10 or less and the 45 related subtraction facts.

As each new learning unit of addition and subtraction facts is introduced, several more columns of three numbers become available for use in practice exercises in column addition. After the indicated pages in the pupil's book have been used, the teacher may add the following examples to the list of possible examples for supplementary use:

After page 109:

$$\begin{array}{cccccccc} 1 & 1 & 7 & 2 & 6 & 3 & 5 & 4 \\ 1 & 7 & 1 & 6 & 2 & 5 & 3 & 4 \\ 8 & 2 & 2 & 2 & 2 & 2 & 2 & 2 \\ \hline \end{array}$$

After page 112:

$$\begin{array}{ccccccccc} 1 & 3 & 2 & 1 & 4 & 2 & 3 & 4 & 5 \\ 3 & 1 & 2 & 4 & 1 & 3 & 2 & 5 & 4 \\ 5 & 5 & 5 & 4 & 4 & 4 & 4 & 1 & 1 \\ \hline \end{array}$$

After page 117:

$$\begin{array}{cccccccc} 1 & 2 & 1 & 6 & 2 & 5 & 3 & 4 \\ 2 & 1 & 6 & 1 & 5 & 2 & 4 & 3 \\ 7 & 7 & 3 & 3 & 3 & 3 & 3 & 3 \\ \hline \end{array}$$

After page 120:

$$\begin{array}{cccccccc} 1 & 3 & 2 & 1 & 5 & 2 & 4 & 3 \\ 3 & 1 & 2 & 5 & 1 & 4 & 2 & 3 \\ 6 & 6 & 6 & 4 & 4 & 4 & 4 & 4 \\ \hline \end{array}$$

These examples complete the list of the 120 possible examples in column addition, with sums of 10 or less, and with three addends. This list does not, of course, include examples with zero, since zeros in addition and subtraction are not included in the program for Grade Two.

The children have had the positional words *first*, *next*, and *last*. In this section, the ordinal numbers *first* to *fifth* will be introduced.

The treatment of fractions will be extended to include the fraction *one-third*, while halves and fourths are maintained.

All through the earlier sections of the book, the children were given exercises which prepared them for making change. They have learned to count pennies by ones, twos, fives, and tens, nickels as fives, and dimes as tens. In this section, they will have experiences in counting which are quite different and which will lead directly into making change. They will count nickels as fives to 20, and pennies as ones from 20 to 25. Then they will count dimes as tens to 20, and pennies as ones from 20 to 25; and they will count two dimes and a nickel, saying, "ten, twenty, twenty-five." Finally, they will count dimes, nickels, and pennies, together.

After these experiences, counting change will be introduced. The exercise will be presented realistically so that the children will be able to understand the procedure and use the skill in out-of-school experiences.

The meaning of numbers to 100 and the reading of numbers to 200 will be maintained also in exercises in this section of the book. These skills and understandings will be utilized in the further development of the addition and subtraction processes.

The sixth and seventh "Making Sure" tests will be given after all of the 45 addition facts and the 45 subtraction facts are introduced. The eighth to thirteenth "Making Sure" tests will be given at the end of the book. The final six tests are planned to help the teacher and the children evaluate the work of the year. They cover quite systematically the various phases of the year's program. From a study of the results of the tests, the teacher will be able to plan a review of the work. The children will be able to find which things they have learned well and which they need to work on during the remainder of the school year.

The tests serve also as a summary of the year's work. The children will be able to realize how many new things they have learned during the year and how much they have grown in their ability to understand and use numbers.

LEARNING TO ADD TWO-PLACE NUMBERS

Preparatory Activities

The addition of two two-place numbers whose sum does not exceed 99 will be developed on pages 106 and 107. The introduction will be made through the use of pictures which show what the numbers mean. Then a number story will be given which yields an example to use in showing how we add larger numbers. Page 107 continues the develop-

Learning to Add Two-Place Numbers (continued)

Preparatory Activities

ment with stories and examples. The two pages should be used together.

Using counting sticks. Counting sticks, straws, toothpicks, etc., which the children have arranged in bundles of ten, can best be used to introduce the new step in addition and to make it meaningful. The following procedure may be used:

Write these numbers on the blackboard and have the children show, with bundles of ten and with single sticks, how many tens and ones each number means: 48, 21, 32, 26, 23, 14, 54, 31, 64, 33.

Then write the numbers on the blackboard again and have the children tell, by filling the blanks, how many tens and ones each number means. This form is suggested:

48 means ____ tens and ____ ones
21 means ____ tens and ____ one
32 means ____ tens and ____ ones
26 means ____ tens and ____ ones

Write this story on the blackboard and let the children read it. Then tell them that we are going to learn to add larger numbers such as those in the number story.

David and his father went to see the animals at the fair. They saw 48 black and white pigs and 21 red pigs. How many pigs did they see at the fair?

Write the example on the blackboard:

$$\begin{array}{lll} 48 \text{ means} & 4 \text{ tens and} & 8 \text{ ones}\\ 21 \text{ means} & 2 \text{ tens and} & 1 \text{ one}\\ \hline 69 & 6 & 9 \end{array}$$

Have the children use bundles of 10 sticks and single sticks to show what 48 and 21 mean. Then have them put the sticks that represent ones together to find how many ones there are. When they have done this, have them add the ones in the example at the right, then in the example at the left.

Then have them put the bundles of 10 sticks together to find how many tens there are. When they have done this, have them add the tens in the example at the right, then in the example on the left.

Then explain that we can add numbers that mean tens and ones without the sticks. In writing the numbers, we put the ones under ones and the tens under tens. We begin at the right and add the ones first. Then we add tens. Have the children read the answer. Then have them tell what the answer is for the question in the number story.

$$\begin{array}{r} 48\\ 21\\ \hline 69 \end{array}$$

Write this number story on the blackboard:

Ann saw the lambs at the fair. There were 23 white lambs and 14 black lambs. How many lambs were there?

Show how to write the example from the story. Let the children show with counting sticks what the numbers mean. Then let them put the single sticks together and tell how many ones, and the tens together and tell how many tens.

$$\begin{array}{r} 23\\ 14\\ \hline \end{array}$$

Have them show where to begin to add and where to write the figure in the answer. Then have them show what to add next and where to write this figure.

Write this story on the blackboard:

There were 32 work horses and 26 riding horses at the fair. How many horses were there at the fair?

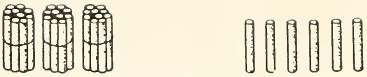
Let the children read the story, tell how to write the numbers, where to begin to add, and where to write the figures in the answer.

Using Page 106

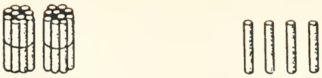
Have the children find how many sticks there are altogether in each picture. Have them read each number, tell what it means, and fill the blanks to show what it means.

Have them identify the tens and ones in each number in the second exercise. Then let them fill in the blanks.

The children may read the number story. Then they may read the directions and work the example after they are helped to understand that the numbers in the example came from the number story. Next, in the final blank, they may write the answer for the question in the story.



36 means ____ tens and ____ ones



24 means ____ tens and ____ ones

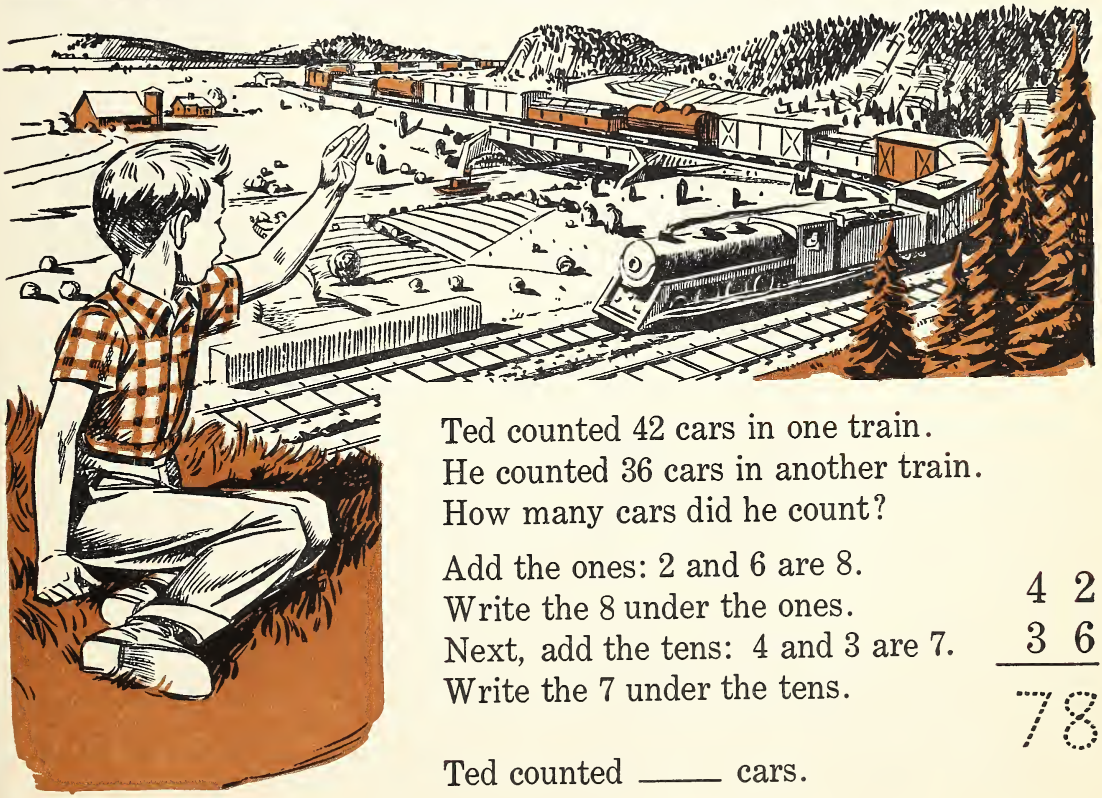
Tens Ones

3 6 means ____ tens and ____ ones

2 4 means ____ tens and ____ ones

1 2 means ____ ten and ____ ones

4 2 means ____ tens and ____ ones



Ted counted 42 cars in one train.
He counted 36 cars in another train.
How many cars did he count?

Add the ones: 2 and 6 are 8.
Write the 8 under the ones.
Next, add the tens: 4 and 3 are 7.
Write the 7 under the tens.

$$\begin{array}{r} 4\ 2 \\ 3\ 6 \\ \hline 7\ 8 \end{array}$$

Ted counted ____ cars.

Learning to Add Two-Place Numbers (continued)

Using Page 107

This page should be used immediately after page 106. It provides the next step in learning to add larger numbers.

The children may read the first number story. With the help of the directions, they are to trace the dotted numbers in the model example and find the answer. Then, they should read the answer to the question in the number story.

The children may read the next two number stories, write the examples, and find the answers. Then they may read the answer to the question in the story.

The directions above the examples may be read by the children. It is necessary to emphasize the fact that we begin at the right to add, and first add the numbers that mean ones. Then we add the numbers that mean tens. Failure to establish this habit will lead to difficulty when carrying and borrowing in addition and subtraction are introduced.

The teacher will wish to supervise the work very carefully at this time. The development of bad habits, such as adding tens before ones, can be prevented by establishing right habits from the beginning.

Follow-up Activities

Additional learning helps. It may be that the slowest learners in the class are not trying to do addition of larger numbers. If this is the case, these children will be working with simple addition and subtraction, or may be taking up column addition if their introduction to it was postponed.

Some of the children may have had difficulty with pages 106 and 107. The teacher will wish to have the children retrace the learning steps in the development, as suggested in the preparatory activities on page 240. The counting sticks should be used to show what the numbers in several examples mean. The examples used should grow out of number stories so that the children can apply the addition process to a realistic situation, and thus attach meaning to it and sense the usefulness of the process.

After two or three stories have been developed in this way, the children may be given an opportunity to read a story or two, to write the examples with the teacher's help, and then to add and find the answers. They will then be ready for some practice examples.

The teacher will wish to keep a careful record of the examples used for supplementary practice and of the addition facts used in the examples. In this way, balanced use of facts and a variety of examples can be maintained. The facts used can be tabulated on a chart which lists all of the facts so far introduced except those having sums of 10. The examples can best be recorded in rows in somewhat systematic order, putting in the first row the examples in which a number is added to a number in the teens, in the second row those in which a number is added to a number in the twenties, and so on, as shown below.

11 27	11 43	14 32	16 53	18 71
21 18	22 54	23 14	26 41	27 52
31 56	32 27	35 42	36 32	38 61
41 11	41 42	43 23	44 32	46 42

Enrichment activities. The children who do not need the teacher's help at this time may be interested in writing number stories that use some of the examples in the exercise at the bottom of page 107. These stories may be written on cards. If the children prefer, they may use the counting sticks to show what the numbers mean. If they wish to do so, they may use some of the games on the arithmetic table.

Betty counted 24 birds one day.
She counted 12 birds the next day.
How many birds did she count?

First, write the 24.
Write 12 under the 24.
Add the ones. Then add the tens.

24
12

The girls made 22 books about birds.
The boys made 15 books about animals.
How many books did the children make?

Tom had 16 yellow flowers in his garden.
He had 11 white flowers in his garden.
How many flowers were in his garden?

Add. Begin at the right each time.

44	53	62	72	51	11	61	31
14	32	25	13	16	27	35	53

71	33	63	22	21	82	37	54
24	16	14	27	48	16	32	23

WORKING WITH GROUPS OF EIGHT, TWO, AND TEN

Preparatory Activities

The next series of experiences with groups of 10 occurs on page 108. These experiences will extend the children's understanding of the number *10* and prepare for the introduction of the next learning unit of addition and subtraction facts.

Using concrete objects. The children may work together to discover the groups of 8, 2, and 10. The teacher may arrange 8 girls and 2 boys around a table. Eight children may be looking at pictures and 2 may be examining sea shells or other small objects. The teacher may proceed as follows:

Ask how many of the children at the table are looking at pictures, how many are looking at sea shells, and how many children there are at the table. Then ask how many boys there are, how many girls there are, and how many children are at the table.

Now have 2 of the children move away from the table. Then ask how many children there are in the front of the room, how many are at the table, and how many are away from the table.

Bring the 10 children to the table again and ask how many there are. Then have 8 of the children move away from the table. Ask how many are at the table and how many are away from the table.

Each child should discover the groups for himself with counting objects, working at his desk. These directions may be given:

Place 8 counters on your desk. Place 2 more counters near them. How many counters are on your desk?

Place 2 more counters on your desk. Place 8 counters near them. How many counters are there in these two groups?

Place 10 more counters on your desk. Move 8 of them to the left. How many are at the right?

Place 10 more counters on your desk. Move 2 of them to the left. How many are at the right?

Using Page 108

Let the children find from examining the pictures at the top of the page that there are some tops in the box and some out of the box in each picture. Then let them study the pictures and write the answers to the questions.

Have them draw tops in the boxes as directed. The tops may be simple line drawings such as those shown in the next column.

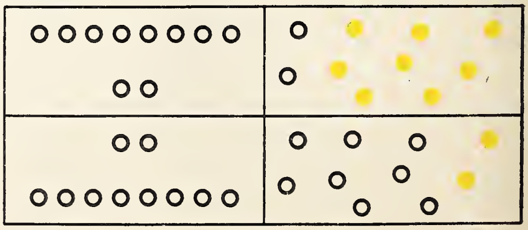
The children may draw other things, such as squares or circles, if they wish.

Have the children study the pictures at the bottom of the page. Then they may read the questions and write the answers.

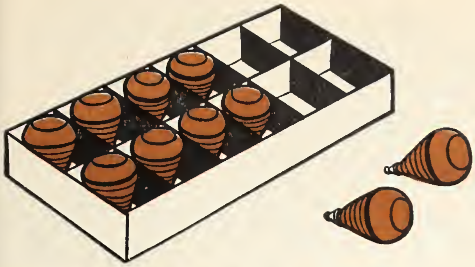
Follow-up Activities

Additional learning helps. The slower learners may be given additional experiences with concrete objects. They may work together to develop the groups, using chairs, boxes, or other large objects. Then each child may use his small counting objects to build the groups independently at his desk.

Following these experiences, the children may make illustrated cards, such as the one shown in the next column, to show the groups of 8, 2, and 10.



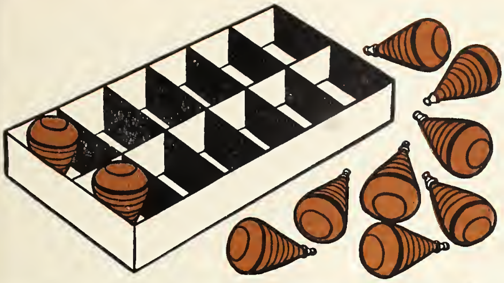
Enrichment activities. The children making illustrated cards for the arithmetic table may make cards showing the new groups.



How many tops are in the box? ______

How many are out of the box? ______

How many tops are there? ______



How many tops are in the box? ______

How many are out of the box? ______

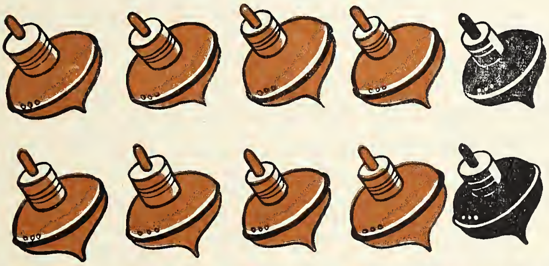
How many tops are there? ______

Draw 8 tops.

Then draw 2 more tops. ______

Draw 2 tops.

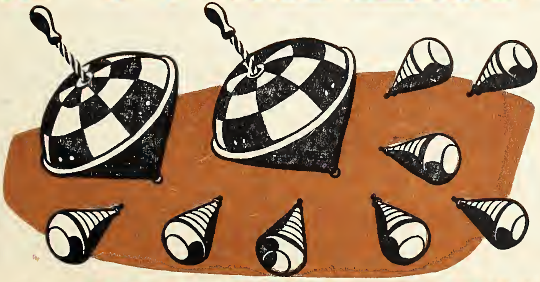
Then draw 8 more tops. ______



How many tops are there? ______

How many are brown? ______

How many are black? ______



How many tops are there? ______

How many are big? ______

How many are little? ______

LEARNING FOUR NEW FACTS

Preparatory Activities

The next learning unit of addition and subtraction facts is presented on page 109. The facts are introduced through action pictures which illustrate oral number stories.

Dramatization. The teacher will wish to have the children discover the new facts by dramatizing number stories. Then the stories may be written on the blackboard. These, or similar stories growing out of actual experiences of the children, may be told and dramatized:

Fred and John were raising pet rabbits. They had 8 rabbits. Fred's father gave them 2 more. How many rabbits did the boys have in all?

The boys wanted to build a house for the rabbits. They had 2 boards. John brought 8 more boards. How many boards did they have then?

When the house was finished, the boys gave the rabbits 10 carrots. The rabbits ate 8 of the carrots. How many carrots were left?

The boys put the 10 rabbits in the house. Two of them got out and ran away. How many rabbits were left then?

Next, the children may build the facts with their counting objects, following oral directions such as these:

Put 8 counters on the desk. Put 2 more near them. How many are 8 and 2?

Put 2 more counters on the desk. Put 8 more near them. How many are 2 and 8?

Now put 10 more counters on the desk. Move 8 of them away. How many are left when you take 8 from 10?

Put 10 more counters on the desk. Move 2 of them away. How many are left when you take 2 from 10?

Look at the groups of counters and say the four new facts.

Using Page 109

Call attention to all the different kinds of ducks in the pictures. Then tell these number stories while the children study the pictures and write the answers for the examples.

One day 8 wild ducks were on the water looking for food. Two more ducks came flying to join them. How many ducks were on the water that day?

Another day 2 wild ducks were on the water. Eight more ducks came swimming toward them. How many ducks were on the water then?

Another day 10 wild ducks were on the water. Eight of them got frightened and flew away. How many ducks were on the water then?

Ten ducks were on the shore. Two of them went into the water. Then how many ducks were on the shore?

Have the children study the composite picture at the bottom of the page. They may use this picture as a help in stating the four facts. Then they may read the directions and write the new facts.

Follow-up Activities

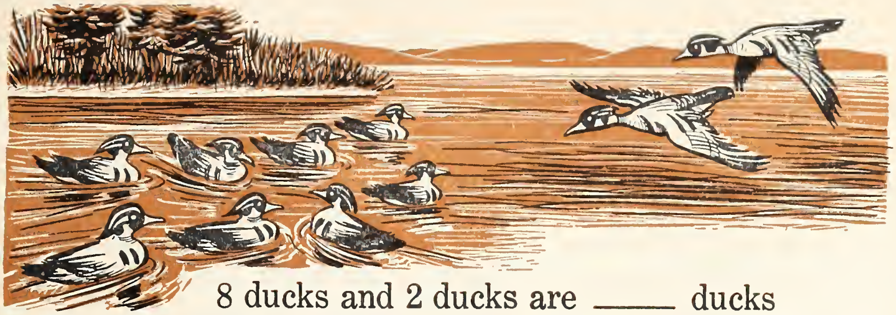
Additional learning helps. The children who need more opportunities to learn the new facts may work together to make stories that use them. Then they may dramatize the stories and build the facts with their counting objects. When the children are sure of the facts, they may write them and make study and practice cards for the facts similar to the illustrated card shown in the next column.

Front

$$\begin{array}{r}8\\+2\\\hline\end{array}\quad\begin{array}{r}2\\+8\\\hline\end{array}\quad\begin{array}{r}10\\-\ 8\\\hline\end{array}\quad\begin{array}{r}10\\-\ 2\\\hline\end{array}$$

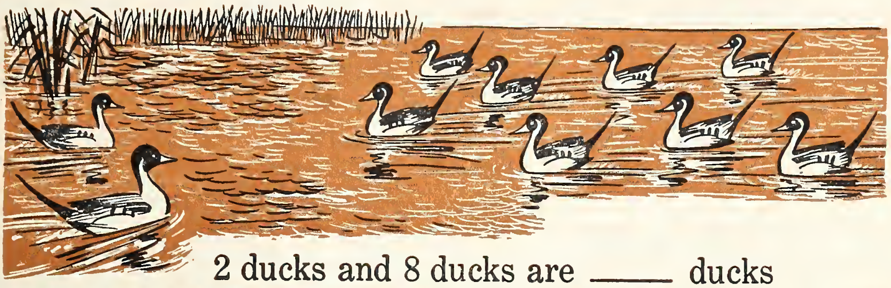
Back

$$\begin{array}{r}8\\+\ 2\\\hline 10\end{array}\quad\begin{array}{r}2\\+\ 8\\\hline 10\end{array}\quad\begin{array}{r}10\\-\ 8\\\hline 2\end{array}\quad\begin{array}{r}10\\-\ 2\\\hline 8\end{array}$$



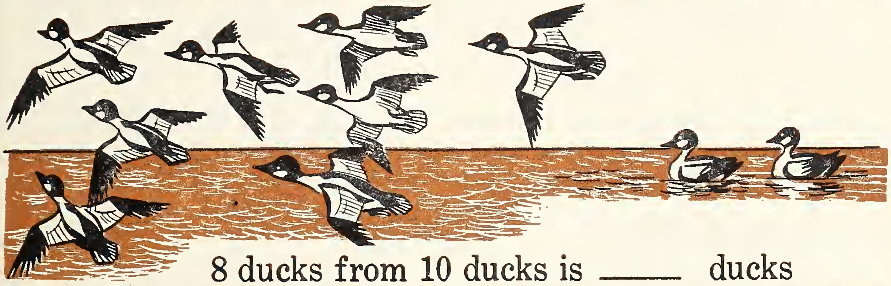
8 ducks and 2 ducks are ____ ducks

8 ducks
+ 2 ducks
____ ducks



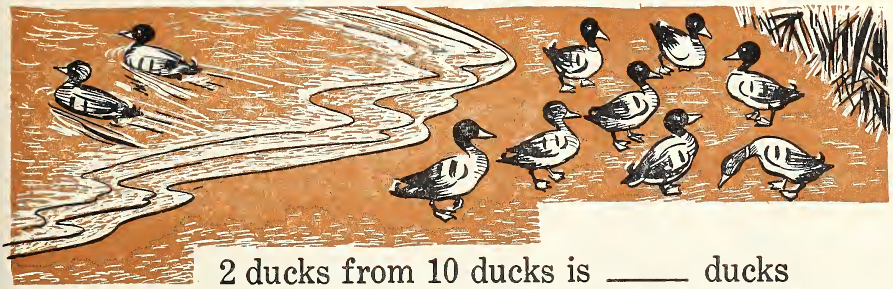
2 ducks and 8 ducks are ____ ducks

2 ducks
+ 8 ducks
____ ducks



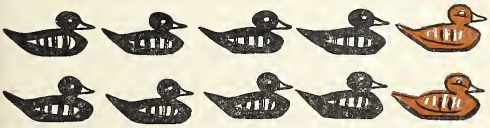
8 ducks from 10 ducks is ____ ducks

10 ducks
− 8 ducks
____ ducks



2 ducks from 10 ducks is ____ ducks

10 ducks
− 2 ducks
____ ducks



+ ____ + ____ − ____ − ____

Four facts have 8, 2, and 10 in them. Write the four facts.

USING ADDITION AND SUBTRACTION IN NUMBER STORIES AND EXAMPLES

Preparatory Activities

Some of the new facts, as well as facts that were learned earlier, are used on page 110 in number stories and examples. One of the number stories and one row of examples involve column addition.

Solving problems as a group activity. Since the children have been working with number stories that involve two-place numbers, it may be wise to give them a few stories involving simple addition and subtraction to work out together as a directed activity. The following stories may be written on the blackboard.

One day the children were playing with toys. Sally had 9 dolls and Mary had 3. How many more did Sally have than Mary?

Ted put 7 cows in his toy barn. Then he put 2 more cows in the barn. How many cows were in the barn then?

Sue was playing with 9 doll dishes. The kitten came and broke 1 dish. How many dishes did Sue have then?

After the children have discussed and solved the problems involving simple addition and subtraction facts, the following problem calling for column addition may be written on the blackboard:

John had 8 boats sailing in the water. Tom brought 1 more boat to sail. Then Bob brought 1 more boat. How many boats were sailing in all?

The children may discuss this problem, write the numbers in example form, add, and find the answer.

Using Page 110

After the children talk about the picture and find what the number stories are about, they may read the stories independently and find the answers.

Then the children may read the directions printed above the examples, and find the answers.

The teacher will observe to find which children need help, and give them whatever help is needed.

Follow-up Activities

The teacher may help the children evaluate their work. They may work together to find which number stories and which examples were worked correctly. Then each child, with the teacher's help, may make a list of the mistakes he made and what caused the mistakes.

Additional learning helps. Those children who need help in reading and understanding number stories may be given some stories to work out together while the teacher gives suggestions, guides the reading, or directs the dramatization of the stories. Then they may read again the stories in the book which caused them trouble. Each child may try to correct his own mistakes.

If some of the children made mistakes because they did not know certain of the addition and subtraction facts, each child may first find which facts he needs to study. He may find the correct answers by building the facts with his counting objects at his desk. Then he may use the illustrated study cards which have on them the facts he needs to study. When he is sure of the correct answers, he may write the facts three or four times.

Enrichment activities. The children who do not need help at this time may work at other things. They may choose a game from the arithmetic table if they wish to do so.

Those children who are making a set of number story cards for the arithmetic table may make a card with a story for each of the four new facts. Some may wish to make stories involving two-place numbers.

Ten boys and 8 girls went to see
the airplanes. How many more boys
than girls were there? ____

The children saw 8 big airplanes
and 2 little airplanes.
How many airplanes did they see? ____

There were 10 airplanes on the ground.
Two of them flew away. How many
airplanes were on the ground then? ____

Two girls and 7 boys went for a ride
in an airplane. How many children
went up in the airplane? ____

The children bought 6 toy airplanes,
3 little cars, and 1 book.
How many things did they buy?

Add or subtract, and write the answers.

9	6	10	9	3	10	8	9	2	9
− 2	+ 3	− 2	− 7	+ 6	− 8	+ 2	− 6	+ 8	− 3

1	5	5	3	2	1	4	2	2	6
2	1	3	4	1	1	2	6	4	1
5	3	2	1	6	8	3	2	2	2

WORKING WITH GROUPS OF FIVE, FOUR, AND NINE

Preparatory Activities

The last in the series of experiences with groups of 9 will be given on page 111. These experiences are planned to extend the children's understanding of the number 9 and also to prepare the children for the introduction of the next learning unit of addition and subtraction facts.

Using concrete objects. If milk bottles are available in the collection of materials used for measuring, they may be used for the introductory experiences which should precede the use of the pupil's book. Other large objects may be substituted if bottles are not available. This plan may be followed:

Arrange 4 pint bottles and 5 quart bottles on a table. Ask the children how many large bottles there are, how many small bottles there are, and how many bottles there are in all. Then ask how many pint bottles there are, how many quart bottles there are, and, again, how many bottles there are altogether.

Ask the children again how many bottles there are. Then move 5 of the bottles away. Ask how many bottles are at that side, and how many are at the other side.

Replace the bottles to form one group. Ask the children once more how many there are in all. Move 4 bottles away and ask how many are at that side and how many are at the other.

The children may use counting objects to build groups, following these directions:

Put 5 counters on your desk. Put 4 more counters near them. How many counters are on the desk?

Put 4 more counters on the desk. Put 5 more counters near them. How many counters are there this time?

Put 9 more counters on the desk. Move 5 of them to the left. How many counters are at the right?

Put 9 more counters on the desk. Move 4 of them to the left. How many counters are at the right?

Using Page 111

Help the children discover that in the pictures some of the china cats are at the left of the books and some are at the right. Have them answer the questions.

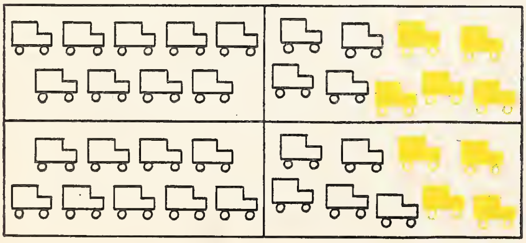
Then they may read the directions and draw the cats. The children may make line drawings as shown here, or they may draw balls or squares if they prefer.

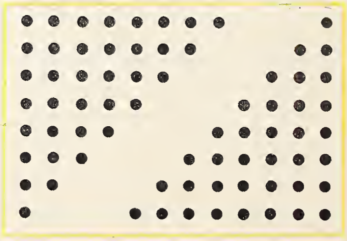
Then the children may study the pictures at the bottom of the page and answer the questions.

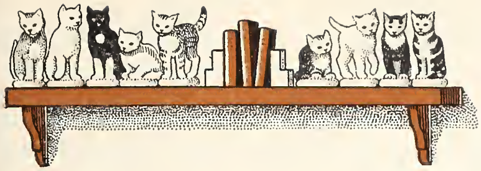
Follow-up Activities

Additional learning helps. The children who need further help may make illustrated cards to show the groups.

Enrichment activities. The faster learners may be interested in making charts to show all of the groups of 9.



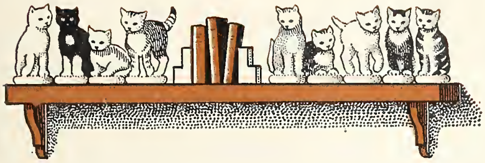




How many cats are at the left? ______

How many are at the right? ______

How many cats are there? ______



How many cats are at the left? ______

How many are at the right? ______

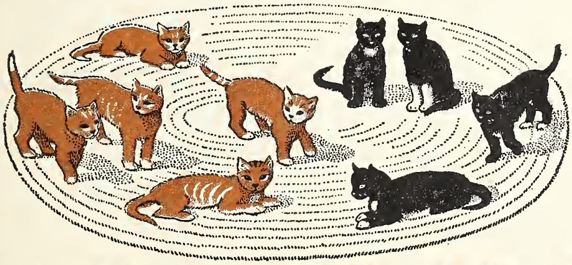
How many cats are there? ______

Draw 5 cats.

Then draw 4 more cats. ______

Draw 4 cats.

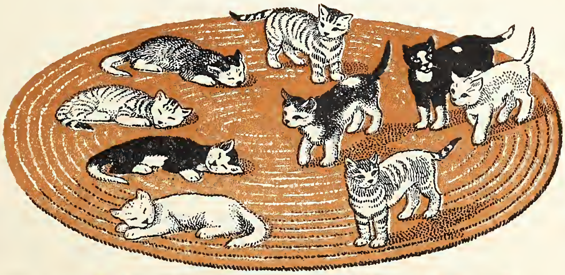
Then draw 5 more cats. ______



How many cats are there? ______

How many are brown? ______

How many are black? ______



How many cats are there? ______

How many are sleeping? ______

How many are not sleeping? ______

LEARNING FOUR NEW FACTS

Preparatory Activities

The last of the learning units of related addition and subtraction facts with sums or minuends of 9 is presented on page 112.

Using dramatization. The teacher may give the number stories below for the children to dramatize. Then the children may write the facts on the blackboard.

The children had some new library books in their room. The boys and girls put cards in the books.

The boys made 5 cards. Then they made 4 more cards. How many cards did they make in all?

The girls pasted cards in 4 new books. The boys pasted cards in 5 books. How many books did they paste cards in altogether?

The girls made 9 covers for the new books. They used 5 of the covers. How many book covers were left?

The boys put 9 new books on a shelf in the reading corner. The children took 4 of the books from the shelf. How many books were on the shelf then?

Using concrete objects. The children may use their small counting objects to build the new facts at their desks, following these directions:

Place 5 counters on your desk. Place 4 more near them. How many are 5 and 4?

Place 4 more counters on your desk. Place 5 more near them. How many are 4 and 5?

Place 9 more counters on your desk. Move 5 of them away. How many are left when you take 5 from 9?

Place 9 more counters on your desk. Move 4 of them away. How many are left when you take 4 from 9?

Look at the groups of counters and say the four new facts.

Using Page 112

Help the children discover that the pictures show a party. Have them study the pictures and write the answers for the examples as you tell these number stories:

Some children were playing with a football at a party. There were 5 children on one side and 4 children on the other side. How many children were playing in all?

Four children went to the table for refreshments. Then 5 more children came. How many children were at the table then?

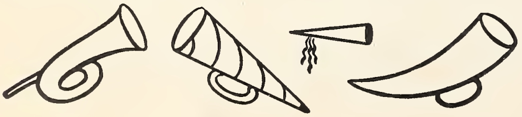
The 9 children were having refreshments. Five of the children left the table and went to play. How many children were having refreshments then?

Later the 9 children were playing another game. Four of them had to go home. How many children were playing then?

Have the children study the composite picture and state the four facts. Then have them read the directions and write the new facts.

Follow-up Activities

Additional learning helps. The children who need more help may make up stories to dramatize, using the facts. Then they may build the facts again with counters, and write the facts two or three times. They may make study and practice cards for the facts, illustrated with toy horns, perhaps, as shown below.



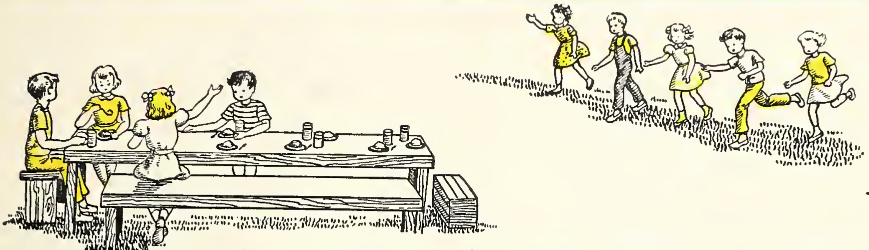
Enrichment activities. The faster learners who are making a chart of the facts may add the four new facts to their charts.

The children who are making sets of practice and study cards for the arithmetic table may make a card for each new fact. Then they may make an illustrated card for the four facts together.

Some of the children may be interested in sorting out all of the cards for facts with sums or minuends of 9. They may see how many they can say.

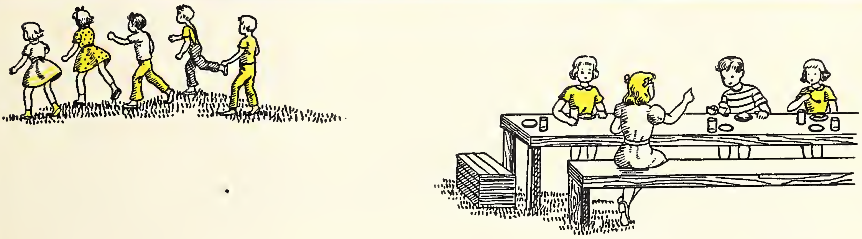
5 children
+ 4 children
____

5 children and 4 children are ____ children ____ children



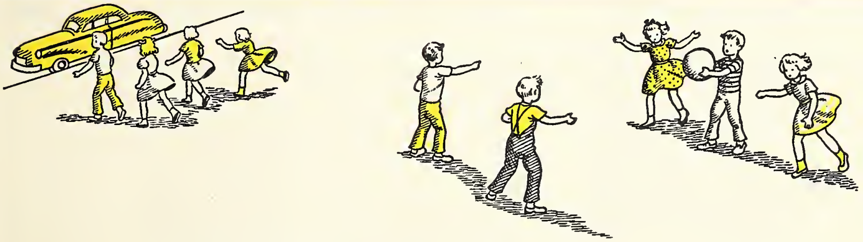
4 children
+ 5 children
____

4 children and 5 children are ____ children ____ children



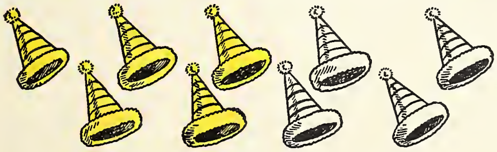
9 children
− 5 children
____

5 children from 9 children is ____ children ____ children



9 children
− 4 children
____

4 children from 9 children is ____ children ____ children



+ ____ + ____ − ____ − ____

Four facts have 5, 4, and 9
in them. Write the four facts.

USING ADDITION AND SUBTRACTION IN NUMBER STORIES AND EXAMPLES

Preparatory Activities

The addition and subtraction facts that were just learned and some that were learned earlier are used in the number stories and examples on page 113. The subtraction concept of "how many more," simple addition, and column addition are involved in the number stories. Examples in column addition are included also.

Learning to interpret number stories. The teacher will wish to provide an opportunity for the children to practise reading and interpreting number stories as an oral activity before they use the exercises in their books. The following, or similar, stories may be written on the blackboard. The children may read them orally and work them out together with the teacher giving whatever help is needed with reading and interpretation.

Some children were having fun after school. Five girls and 2 boys were swinging. How many children were swinging in all?

There were 8 swings. Only 7 swings were needed. There were more swings than were needed. How many more?

The boys were playing marbles. John put 3 marbles in the ring, Ted put 3 in the ring, and Bob put 3 in the ring. How many marbles were in the ring?

The girls were washing doll dresses. Mary washed 8 dresses and Sally washed 6. How many more dresses did Mary wash than Sally?

Using Page 113

After the children discuss the pictures, they may read the number stories independently and find the answers to the questions. The teacher will wish to observe to find which children, if any, need help. The help should be given individually so that those children who can may work out the number stories alone.

The children may then read the directions and write the answers for the examples.

Follow-up Activities

The teacher and children may work together to evaluate the work. The children should check their answers under teacher supervision. Then a tabulation should be made to find which number stories and examples caused no difficulty and which need further attention. Through the evaluation, the teacher and each child will find what needs to be done next.

Each child should know which facts, if any, he needs to study and which number stories, if any, he needs help in interpreting. The evaluation should not be a mere matter of finding a score or a grade, but rather of finding the specific things each child needs to do in the interest of his own growth in arithmetic.

Additional learning helps. Any children needing help with addition and subtraction facts may use their counting objects to work out the facts they missed. Then they should find the study cards for those particular facts and study them.

Any children needing help with problem solving should be helped to read and interpret some number stories similar to those they missed. Then they should read the stories in their books again and correct their mistakes.

Enrichment activities. The children who need no help at this time may find pictures in magazines, or draw pictures of toys and other things which can be used soon for "playing store" in connection with adding two-place numbers involving money and counting change. Others may write on cards for the game table original illustrated number stories that use the new facts.

Sue and Bob helped Mother with the work.
Bob went to the hen house to get the eggs.
He found 4 white eggs and 5 brown eggs.
How many eggs did he find? ______

Sue and Mother had 9 eggs. They needed
5 eggs for a cake. They had more eggs
than they needed. How many more? ______

Sue put 9 red flowers and 4 blue flowers
in a basket. How many more red flowers
than blue flowers were there? ______

Bob went to feed the pets. There were
2 pet ducks and 8 pet rabbits.
How many pets did Bob feed? ______

Bob put the toys away. There were
2 cars, 3 dolls, and 5 other toys.
How many toys did he put away?

Add or subtract, and write the answers.

2	9	5	10	7	9	8	9	4	10
+ 8	− 6	+ 4	− 2	+ 2	− 5	+ 2	− 4	+ 5	− 8

2	6	4	2	5	1	3	3	7	1
2	2	5	2	4	1	1	3	1	4
3	2	1	1	1	3	5	3	2	4

LEARNING THE ORDINALS *FIRST* TO *FIFTH*

Preparatory Activities

The terms *first, next,* and *last* were retaught as part of the reteaching program in this grade. The children's understanding of ordinals may now be extended to include *second* to *fifth.* Page 114 of the pupil's book provides exercises for this purpose.

Using realistic experiences. Many classroom activities lend themselves to the development of ordinals. The following will indicate the type of activity that can be used:

If the children are seated in rows, the teacher and children probably refer often to the first, second, or third row or the first, second, or third child in a specified row. The children should understand that before a row or child can be so identified, we must designate which we wish to consider as the first. The first row may be the one at our right or the one at our left. The first child may be the one in the front or at the back of the row.

It may be necessary to demonstrate this idea by having 5 children line up facing the left. Identify the first child. Then let the children identify the second child, and so on. Then have the children stand in the same order in the row, but facing right. Identify the child at the right as the first child. Let the children identify the second child, etc.

Next, have the children face the class. It can be seen at once that until it is decided who is first, we cannot tell who is second. So we must say, "The first child at the left or the first child at the right."

The ordinals can be developed also in classroom activities that pertain to rows of material on the blackboard or in books, the examples in an exercise, or pictures on the bulletin board.

Pictures which the children have clipped from magazines may lend themselves to use in getting the children ready for the exercises in their books. The first child in a picture of a row of children, the first toy in a row of toys, etc., can be identified. Then the other ordinals can be introduced.

Using Page 114

After the children discuss the picture, they may read the names of the boys in the race. Then they may read and answer the questions. The first exercise may be done as a group activity. Then the second should be done by each child independently.

Follow-up Activities

Additional learning helps. Any children who need more opportunities to understand the ordinals should have further experiences with concrete objects. For example, have the children arrange a row of 5 books on a table. John may take 1 book and set it up. Then Mary may take another. Continue until there are 5 books lined up. Then ask:

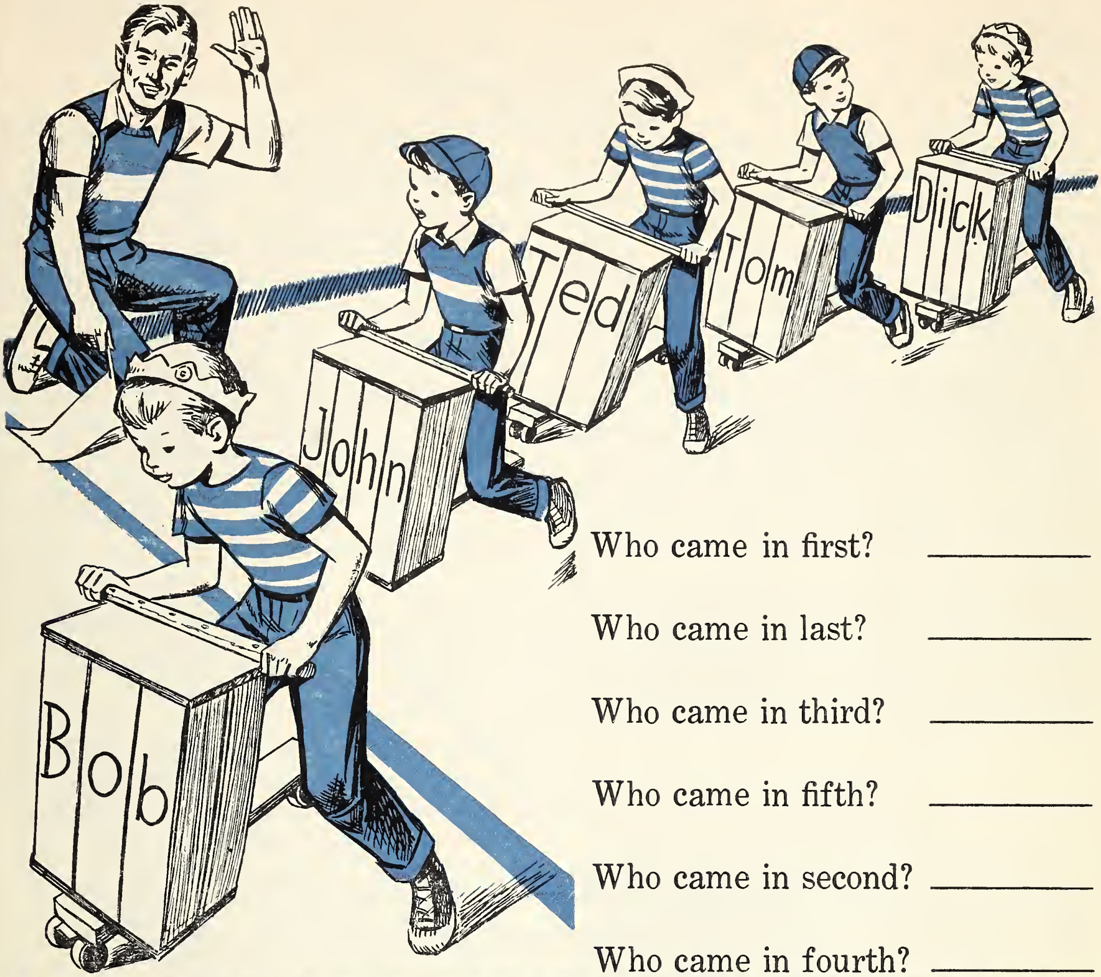
Who went up first to take a book? Who went up second? etc.

Which book was set up first? Which was set up second? etc.

Which is the first book? the second? etc.

Pictures may be used next. One child at a time may draw a picture on the blackboard until 5 are drawn in a row. Then the questions may be repeated.

Enrichment activities. The children who do not need help may build an ordinals chart. They may draw on narrow strips of paper rows of animals, children, or toys, with 5 pictures in each row. The pictures in some rows should face left, in others, right; and in others, front. Then let the group choose for the chart 5 rows of objects that the children have drawn. The strips of paper containing the drawings may be pasted on the chart. Use the ordinal words *first* to *fifth* to label the individual pictures in each row. Label the rows also.



Who came in first? __________

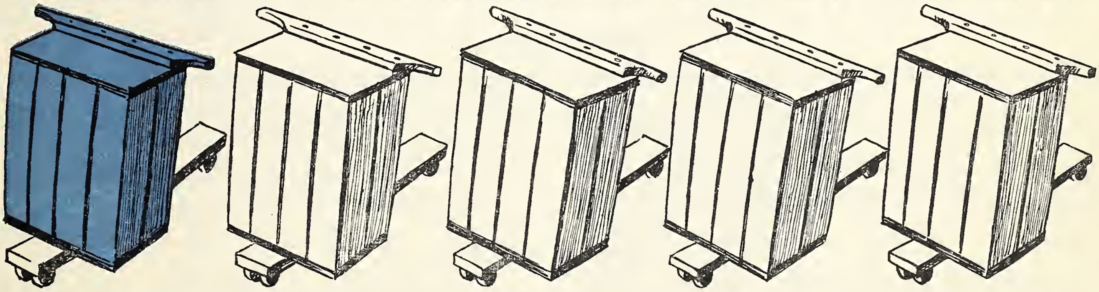
Who came in last? __________

Who came in third? __________

Who came in fifth? __________

Who came in second? __________

Who came in fourth? __________



The first box is blue.
Color the second box red.
Color the third box green.
Color the fourth box yellow.
Color the fifth box brown.

ADDING LARGER MONEY NUMBERS

Preparatory Activities

Since children's experiences with money probably outnumber all other out-of-school experiences in which arithmetic functions, the *Making Sure of Arithmetic* program applies to situations involving money as many as possible of the skills that are developed in the program. On page 115 adding larger numbers is applied to number stories and examples which involve money.

Using realistic experiences. The introduction to the addition of two-place numbers involving money can be made through the use of realistic experiences developed concretely. The following plan may be followed:

Bill bought a book that cost 63 cents and another book that cost 24 cents. How much did he pay for the books altogether?

Set up the example from the problem on the blackboard, as follows:

63¢
24¢

Now ask the children how many dimes and how many pennies 63¢ means. Write what it means after the 63¢ in the example. Follow the same procedure for 24¢. Now the example should look like this:

63¢ means 6 dimes and 3 pennies
24¢ means 2 dimes and 4 pennies

Place on the table 6 dimes and 3 pennies. Place under them 2 dimes and 4 pennies. Then ask the children to tell how many pennies there are. Write the 7 in the answer. Then ask them to tell how many dimes there are. Write the 8 in the answer. Then ask who can write the number that means 8 dimes and 7 pennies using the cent sign. Have the child write 87¢ under the answer in the model example. The completed example should look like this:

63¢ means 6 dimes and 3 pennies
24¢ means 2 dimes and 4 pennies
87¢ 8 7

Ask a child to write the numbers from the number story as an example with the cent sign after each number, as in the example at the right. Explain that we add numbers that mean money in the same way that we add other numbers. But we use the sign that tells us they mean money. Help them add the numbers and write the answer.

63¢
24¢

Using Page 115

Discuss the picture to help the children understand what the number stories are about. Then have them read the first story together. They may trace the numbers and signs and find the answer, labeling it ¢.

Let the children read the other stories and find the answers independently. The teacher will give help as it is needed.

The children may read the directions and find the answers for the examples.

Follow-up Activities

Additional learning helps. If any of the children had difficulty with the number stories and examples, the teacher may give them practice with similar number stories. They may use toy money to work out one or two stories. Then they may write the examples from the stories using the cent sign. They may add, and write the answers.

The children should correct the mistakes in their books. Then each child may study the addition facts which caused him trouble.

Enrichment activities. The children who had no difficulty may use some of the pictures they cut from magazines and write number stories that involve money. They may use the examples on page 115 as a guide so that the examples from the number stories will be within their ability.

The children went for a train ride. The train ride cost 42 cents. It cost 12 cents to get to and from the train. How much did each child pay?

$$\begin{array}{r} 42\text{¢} \\ \underline{12\text{¢}} \end{array}$$

Write the cent sign after the answer.

Mary paid 54 cents to go with the children. She paid 15 cents for milk on the train. How much money did she pay in all?

John paid 25 cents for an apple and milk on the train. He paid 54 cents to go with the children. How much money did John pay in all?

There were 18 boys and 21 girls who went for the train ride. How many children were there?

Add. Write the cent sign when the answer means money.

$\begin{array}{r} 14\text{¢} \\ \underline{43\text{¢}} \end{array}$	$\begin{array}{r} 52 \\ \underline{31} \end{array}$	$\begin{array}{r} 83 \\ \underline{16} \end{array}$	$\begin{array}{r} 23\text{¢} \\ \underline{44\text{¢}} \end{array}$	$\begin{array}{r} 41 \\ \underline{53} \end{array}$	$\begin{array}{r} 45 \\ \underline{24} \end{array}$	$\begin{array}{r} 31\text{¢} \\ \underline{28\text{¢}} \end{array}$	$\begin{array}{r} 42 \\ \underline{45} \end{array}$
$\begin{array}{r} 73\text{¢} \\ \underline{15\text{¢}} \end{array}$	$\begin{array}{r} 21 \\ \underline{35} \end{array}$	$\begin{array}{r} 51 \\ \underline{26} \end{array}$	$\begin{array}{r} 12\text{¢} \\ \underline{16\text{¢}} \end{array}$	$\begin{array}{r} 76 \\ \underline{21} \end{array}$	$\begin{array}{r} 32 \\ \underline{17} \end{array}$	$\begin{array}{r} 63\text{¢} \\ \underline{23\text{¢}} \end{array}$	$\begin{array}{r} 61 \\ \underline{37} \end{array}$

WORKING WITH GROUPS OF SEVEN, THREE, AND TEN

Preparatory Activities

The next in the series of experiences with groups of 10 is presented on page 116 of the pupil's book. These experiences will pave the way for the introduction of the next learning unit of addition and subtraction facts. They will also help to enrich the children's understanding of the number *10.*

Using concrete objects. The teacher may use large objects for a group activity through which the children can discover the groups of 7, 3, and 10. The following plan, or a similar one, may be used:

The teacher may arrange 7 foot rulers and 3 yardsticks in the chalk tray at the blackboard. She may ask how many short rulers there are, how many long rulers there are, and how many rulers there are altogether. Then she may ask how many yardsticks there are, how many foot rulers there are, and how many rulers there are in all.

Rearrange the 10 rulers in a single group and ask how many there are. Then move 7 of them to the left and ask how many are at that side and how many are at the other.

Rearrange the 10 rulers in a single group again and ask how many there are. Move 3 rulers to the left and ask how many are at that side and how many are at the other.

Then each child may use his counters to carry out these instructions:

Put 7 counters on your desk. Put 3 more near them. How many are there in all?

Put 3 more counters on your desk. Put 7 more near them. How many are there?

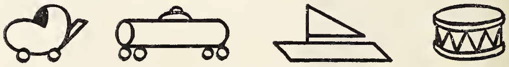
Put 10 more counters on your desk. Move 7 of them to the left. How many are at the right?

Put 10 more counters on your desk. Move 3 of them to the left. How many are at the right?

Using Page 116

Let the children discuss the pictures to bring out the fact that some toys are on the top shelf and some are on the bottom shelf. Then let them read the questions and write the answers.

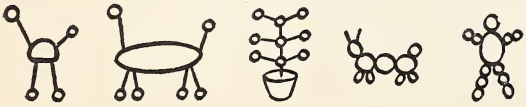
Have them read the directions and draw the toys. Any toy will do. The children may use their own ideas or these may be suggested:



Then have them study the pictures at the bottom of the page and answer the questions.

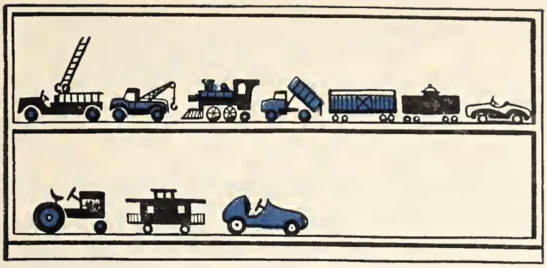
Follow-up Activities

Additional learning helps. If there are any children who seem to need more experiences with groups, they may be given activities with large objects and with counting objects, similar to those described under preparatory activities. Since these children will be likely to need help again, it will be a good idea to have them make illustrated cards that picture the groups. They may use their own ideas for pictures, or they may follow these models:



Enrichment activities. The children who demonstrated the fact that they do not need more help with groups may find other things to do. Some of them may be interested in making more toy money if there is not an adequate supply for use in counting change. Others may wish to draw lines and estimate their length. Then they may measure them to see how near their estimate was. Perhaps they are making something in art or another subject that requires measuring.

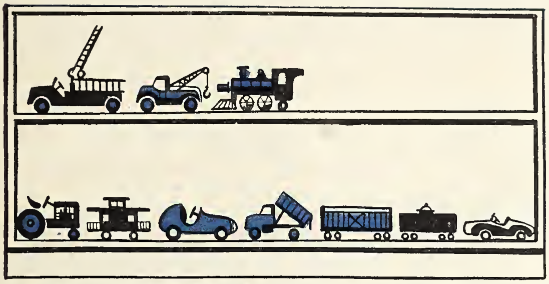
Some of these children may wish to make illustrated cards showing the new groups. These cards may be added to the set on the arithmetic table.



How many toys are at the top? ____

How many are at the bottom? ____

How many toys are there? ____



How many toys are at the top? ____

How many are at the bottom? ____

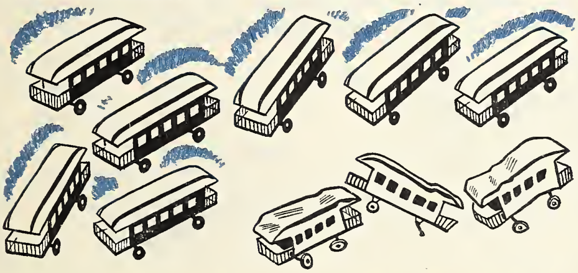
How many toys are there? ____

Draw 7 toys.

Then draw 3 more toys. ____

Draw 3 toys.

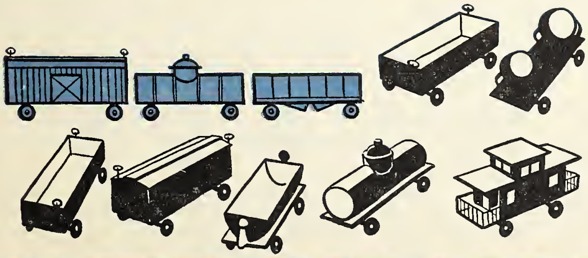
Then draw 7 more toys. ____



How many cars are there? ____

How many are new? ____

How many are old? ____



How many cars are there? ____

How many are blue? ____

How many are black? ____

LEARNING FOUR NEW FACTS

Preparatory Activities

The next learning unit of related facts is presented on page 117 through action pictures which illustrate oral number stories.

Dramatization. The teacher may tell these, or similar, number stories for the children to dramatize. After the dramatization, the children may write the facts on the blackboard.

One day some children made taffy apples. Jane made 7 apples and Ted made 3. How many apples did they make?

Mary made 3 taffy apples and Fred made 7. How many apples did they make in all?

Ann and Sue made 10 taffy apples. They sent 7 of them to the children next door. How many apples did they have left?

Bill and Tom made 10 taffy apples. They ate 3 of them. How many apples did they have then?

Using concrete objects. Each child may use his counting objects to build the facts as his teacher gives these directions:

Place 7 counters on your desk. Place 3 counters near them. How many are 7 and 3?

Place 3 more counters on your desk. Place 7 counters near them. How many are 3 and 7?

Place 10 more counters on your desk. Move 7 of them away. How many are left when you take 7 from 10?

Place 10 more counters on your desk. Move 3 of them away. How many are left when you take 3 from 10?

Look at the counters and say the new facts.

Using Page 117

The teacher may tell these number stories as the children study the pictures and write the answers for the examples:

Seven boys went up on the hill to fly kites. Three more boys came with kites. Then how many boys were flying kites?

Three boys were fishing. Seven more boys came. How many boys were fishing then?

Ten girls were skating. Seven girls went home. How many girls were skating then?

Ten girls were jumping rope. Three of the girls went home. Then how many girls were jumping rope?

Have the children study the composite picture and use it to state the four facts. Then they may read the directions and write the facts in the space provided.

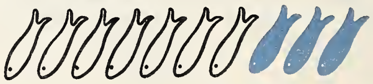
Follow-up Activities

Additional learning helps. The slower learners may study the cards they made with the pictured groups of 7, 3, and 10. Then they may make up number stories that use the new facts, use their counters again to build the facts, and write the facts three or four times. Then they may make study and practice cards for the facts.

Front

$\begin{array}{r} 7 \\ +3 \\ \hline \end{array}$ $\begin{array}{r} 3 \\ +7 \\ \hline \end{array}$ $\begin{array}{r} 10 \\ -\ 7 \\ \hline \end{array}$ $\begin{array}{r} 10 \\ -\ 3 \\ \hline \end{array}$

Back



$\begin{array}{r} 7 \\ +\ 3 \\ \hline 10 \end{array}$ $\begin{array}{r} 3 \\ +\ 7 \\ \hline 10 \end{array}$ $\begin{array}{r} 10 \\ -\ 7 \\ \hline 3 \end{array}$ $\begin{array}{r} 10 \\ -\ 3 \\ \hline 7 \end{array}$

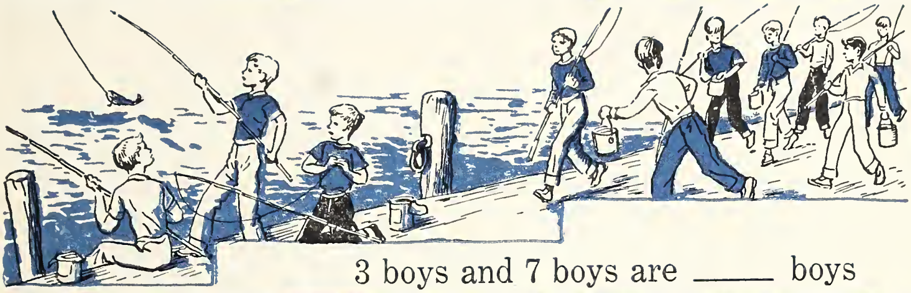
Enrichment activities. The faster learners may make a single card for each new fact and also an illustrated card for the four related facts.

Some of the children are keeping charts of the new facts as they are introduced. The four new facts may be added to these charts.

7 boys
+ 3 boys

7 boys and 3 boys are ____ boys

____ boys



3 boys
+ 7 boys

3 boys and 7 boys are ____ boys

____ boys

10 girls
− 7 girls

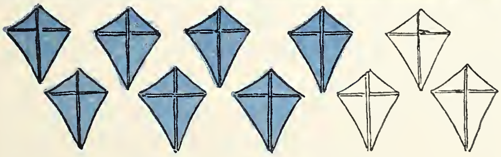
7 girls from 10 girls is ____ girls

____ girls

10 girls
− 3 girls

3 girls from 10 girls is ____ girls

____ girls



Four facts have 7, 3, and 10 in them. Write the four facts.

+ ____

+ ____

− ____

− ____

USING ADDITION AND SUBTRACTION IN NUMBER STORIES AND EXAMPLES

Preparatory Activities

The number stories and examples on page 118 of the pupil's book use the addition and subtraction facts that were just learned as well as some that were learned earlier. Examples in column addition are also included.

Learning to interpret number stories. The children should be given an opportunity to interpret a few number stories as a group activity before they use the material in their books. These, or similar, stories may be written on the blackboard. The children may read them orally and find the answers together. If they need help in interpreting the stories, they may dramatize them or make pictures to illustrate them.

One day the children made things out of paper. The boys made 8 large kites and 2 small kites. How many kites did they make in all?

The girls cut out 10 paper dolls and 9 doll hats. How many more dolls than hats did they have?

The boys made 9 paper hats. They wanted to wear them. But 3 of the hats were too little. How many hats could they wear?

The girls cut out 10 flowers. They wanted to put them all on the doll hats. But 2 of the flowers got lost. How many flowers did the girls put on the hats?

The teacher will wish to look over the stories in the pupil's book to anticipate and introduce as reading words any words that may cause reading difficulty.

Using Page 118

The children may discuss the picture to find what the number stories are about. Then they may read the stories independently and find the answers. The teacher will be alert to the need for help by individuals, and provide the help when it is needed.

The children may read the directions above the examples, and find the answers.

Follow-up Activities

The teacher will wish to take this opportunity to help the children evaluate their work. They may work together, with each child checking his own work. Then they may discuss the stories and examples that caused difficulty. This will help each child understand his own strengths and weaknesses.

Additional learning helps. If some of the children need help with reading and interpreting number stories, they and the teacher may reread those stories in the pupil's book that caused difficulty, and try again to interpret them. Sometimes a guiding question will help a child understand a number story.

For example, in the first story the teacher may ask, "What does the second sentence tell you?" But in the fifth story she would wish to ask, "What does the first sentence tell you?"

In the third story the teacher may ask, "What happens first in the story? What happens next? What does the question ask?" In the fourth and sixth stories she may suggest that the child read again to find how many frogs (or turtles) there were and what happened to some of them.

In each case the teacher will direct the child to read the question in the story again after he answers her question.

If some of the children need help with addition or subtraction facts, they may use concrete objects, the illustrated group cards, and the study and practice cards to learn the facts they missed.

Enrichment activities. The children who do not need help may make number story cards for the new facts. Or, if they prefer, they may practise reading and writing numbers from 100 to 200.

One day the children went fishing.
The boys got 10 fish and the girls got 3.
How many more fish did the boys catch
than the girls? ____

The children ate dinner under a tree.
They ate 3 big fish and 7 little fish.
How many fish did they eat in all? ____

A man took 5 boys for a ride in a boat.
Then he took 4 girls for a ride.
How many children had rides in the boat? ____

The boys saw 10 frogs. They wanted to catch
all of them. But 9 frogs got away.
How many of the frogs did they catch? ____

The children saw 7 turtles on the ground
and 3 in the water. How many turtles
did the children see? ____

The boys wanted to catch the 10 turtles.
Seven of the turtles got away.
How many turtles did the boys catch? ____

Add or subtract, and write the answers.

10	2	9	3	10	10	9	7	8	10
− 7	+ 8	− 5	+ 7	− 9	− 3	− 4	+ 3	+ 2	− 1

1	2	4	6	3	3	2	3	1	5
7	2	3	1	4	2	1	5	3	2
2	5	3	1	3	4	7	2	2	3

WORKING WITH GROUPS OF SIX, FOUR, AND TEN

Preparatory Activities

The last series of experiences with groups of 10 is provided on page 119 of the pupil's book.

Using concrete objects. The following plan is suggested for an exercise in which all of the children may work together to discover the groups:

Arrange 10 books on a table or on the teacher's desk. Six of the books may be larger than the others, and have covers of a different color. For example, 6 large music books with blue covers and 4 small readers with red covers may be used.

Ask how many blue books there are, how many red books there are, and how many books there are in all. Then ask how many small books there are, how many large books, and how many books there are in all.

Rearrange the books with 6 at the left and 4 at the right. Then ask how many books there are in all, how many are at the left, and how many are at the right.

Rearrange the books once more, putting 4 at the left and 6 at the right. Then ask again how many books there are, how many are at the left, and how many are at the right.

Each child may build the groups with his counting objects, as follows:

Put 6 counters on your desk. Put 4 more counters near them. How many counters are on the desk?

Put 4 more counters on your desk. Put 6 more counters near them. How many counters are there this time?

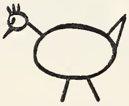
Put 10 more counters on your desk. Move 6 of them to the left. How many counters are at the right?

Put 10 more counters on your desk. Move 4 of them to the left. How many counters are at the right?

Using Page 119

Call attention to the fact that some of the hens in the pictures are on the nests and some are not on nests. Have the children read the questions and find the answers.

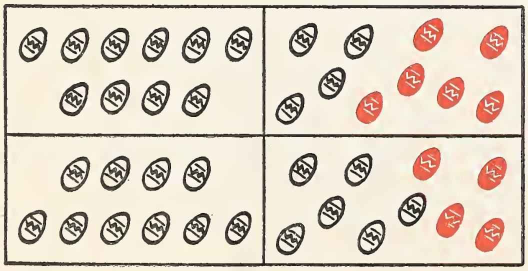
Then have the children read the directions and draw the hens. They may use their own ideas, or make pictures like these:



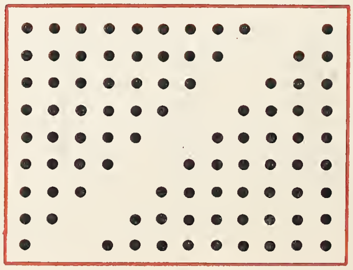
Have the children study the pictures at the bottom of the page and answer the questions about them.

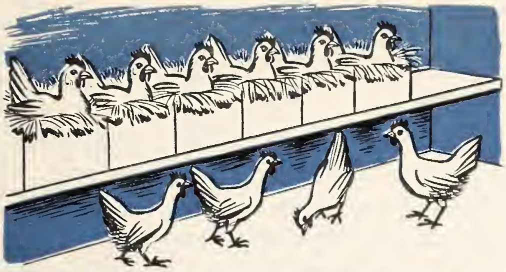
Follow-up Activities

Additional learning helps. If some of the children seem to need more help in recognizing groups of 6, 4, and 10, they may build the groups again with counters. Then they may make illustrated cards to show the groups. This plan is suggested:



Enrichment activities. The children who do not need help with groups may be interested in making a chart to show all of the groups of ten, since this is the last in the series of experiences. The plan suggested here may be used:

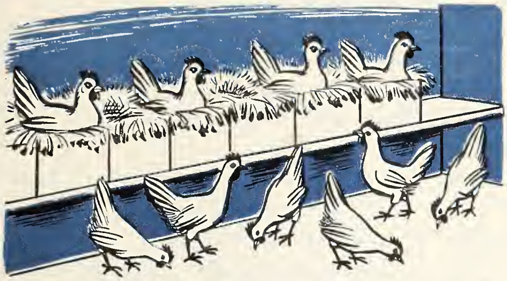




How many hens are on nests? ____

How many are not on nests? ____

How many hens are there? ____



How many hens are on nests? ____

How many are not on nests? ____

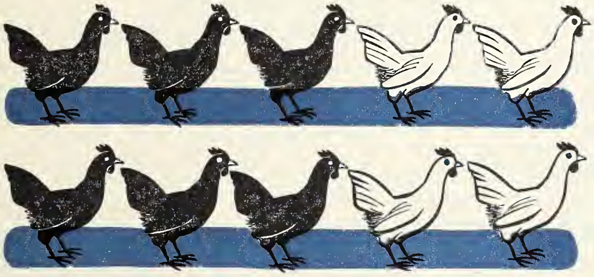
How many hens are there? ____

Draw 6 hens.

Then draw 4 more hens. ____

Draw 4 hens.

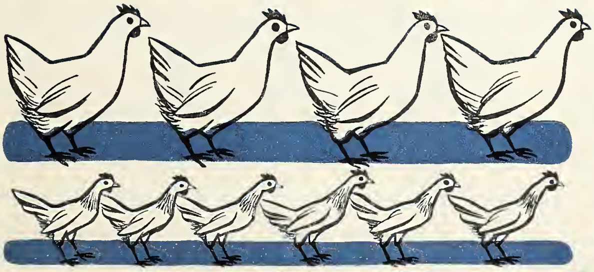
Then draw 6 more hens. ____



How many hens are there? ____

How many are black? ____

How many are white? ____



How many hens are there? ____

How many are big? ____

How many are little? ____

LEARNING FOUR NEW FACTS

Preparatory Activities

The last of the learning units of related addition and subtraction facts to be introduced in Grade Two is presented on page 120.

Dramatization. These, or similar stories, may be told for the children to dramatize. The facts may be written on the blackboard as they are discovered.

The children were all playing in Bob's back yard. First they made an airport. They made 6 big buildings and 4 little buildings. How many buildings did they have?

Tom brought 4 airplanes for the airport. Then John brought 6 more. How many airplanes did they have at the airport?

The girls brought 10 boxes to make a train. They used 6 of the boxes for the train. How many boxes were left?

The children brought 10 boards to make a tree house. They used 4 of them. How many boards did they have left?

Using concrete materials. The children may use their counting objects to build the new facts at their desks. The teacher may give them these directions:

Place on your desks 6 counters. Place 4 more near them. How many are 6 and 4?

Place 4 more counters on your desks. Place 6 more near them. How many are 4 and 6?

Place 10 more counters on your desks. Move 6 of them away. How many are left when you take 6 from 10?

Place 10 more counters on your desks. Move 4 of them away. How many are left when you take 4 from 10?

Look at the groups of counters and say the four addition and subtraction facts.

Using Page 120

Have the children study the pictures and write the answers for the examples as the teacher tells these number stories:

There were 6 horses running in the pasture. The men rode 4 more horses in. How many horses were there in all?

One day 4 horses were drinking at a stream. Then 6 more horses came to drink. How many horses were drinking in all?

Ten horses were grazing. Six of the horses went away. How many horses were grazing then?

There were 10 horses in the corral. The men rode 4 of the horses away. How many horses were left in the corral?

Have the children study the composite picture and state the four facts. Then they may read the directions and write the facts.

Follow-up Activities

Additional learning helps. The slower learners may make up and dramatize number stories that use the facts, build the facts again with their counters, and make illustrated study and practice cards.

Front

$$\begin{array}{r} 6\\ +4\\ \hline \end{array} \quad \begin{array}{r} 4\\ +6\\ \hline \end{array} \quad \begin{array}{r} 10\\ -\ 6\\ \hline \end{array} \quad \begin{array}{r} 10\\ -\ 4\\ \hline \end{array}$$

Back

$$\begin{array}{r} 6\\ +\ 4\\ \hline 10 \end{array} \quad \begin{array}{r} 4\\ +\ 6\\ \hline 10 \end{array} \quad \begin{array}{r} 10\\ -\ 6\\ \hline 4 \end{array} \quad \begin{array}{r} 10\\ -\ 4\\ \hline 6 \end{array}$$

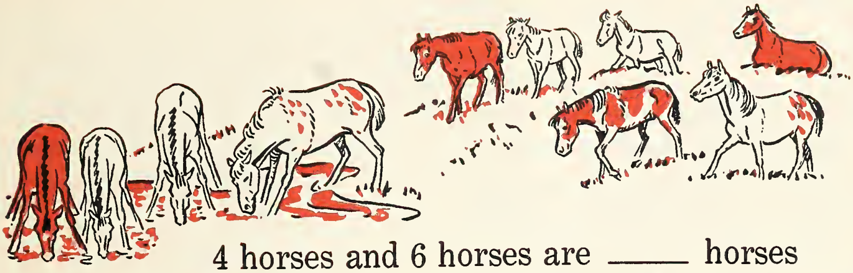
Enrichment activities. The faster learners may make an illustrated card for the four related facts, and separate cards for each of the four facts.

Those children who are charting the facts may add the four new facts to their charts.

Some of the children may find it interesting to sort out all of the cards showing groups of 10 and all of the study and practice cards for facts with sums or minuends of 10. Then they may sort out those with sums or minuends of 9, then 8, etc. This will make an interesting summary of the facts that have been introduced.

6 horses and 4 horses are ____ horses

6 horses
+ 4 horses
____ horses

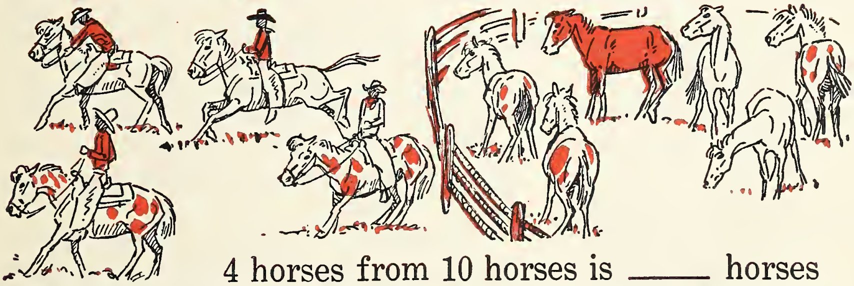


4 horses and 6 horses are ____ horses

4 horses
+ 6 horses
____ horses

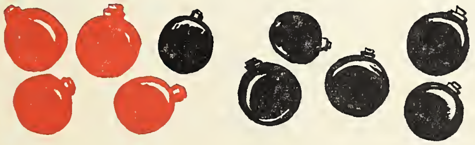
6 horses from 10 horses is ____ horses

10 horses
− 6 horses
____ horses



4 horses from 10 horses is ____ horses

10 horses
− 4 horses
____ horses



+ ____   + ____   − ____   − ____

Four facts have 6, 4, and 10
in them. Write the four facts.

USING ADDITION AND SUBTRACTION IN NUMBER STORIES AND EXAMPLES

Preparatory Activities

The number stories and examples on page 121 use the facts that were just learned and some of the other facts. The stories provide practice in using the two concepts of subtraction. There are examples which provide practice in column addition also.

Learning to interpret number stories. These number stories, or similar stories, may be written on the blackboard.

One day the girls and boys were playing with building blocks. The girls had 9 long blocks. They used 4 of them for a road. How many of their blocks were left?

The girls needed 8 blocks to build a pen. They had 5 blocks. How many more did they need?

The boys used 2 long blocks and 7 short blocks to build a bridge. How many blocks did they use?

The boys wanted 9 blocks for a train. They had 3 blocks. How many more blocks did they need?

As the children read the stories together and try to find the answers, the teacher may help them by asking questions to guide their thinking or by suggesting that they make pictures to aid with the interpretation of the stories.

Using Page 121

The picture may be used to create an interest in the stories and to find what they are about. Then the children may read the stories and find the answers independently. If some children have difficulty, they may be helped individually.

The children may read the directions above the examples and do the examples.

Follow-up Activities

The teacher and the children may work together to evaluate the children's work, with each child helping to check his own work. The effort should be directed toward helping him find which stories and examples he did correctly and which caused trouble. When the child knows what caused his trouble, he will know how to work to correct the difficulty.

Additional learning helps. The children who need help with problem solving may be helped by the teacher to read again and interpret the stories that caused the difficulty. Then they may be given more number stories similar to those in the book to read and interpret.

The children who need help with the addition and subtraction facts may use their counting objects to work out the facts they missed. Then they may use the illustrated study and practice cards to study the facts. After they are sure of the answers, they may write the facts three or four times. Then these children may be given simple addition and subtraction examples and column addition examples containing the facts that caused them difficulty.

Enrichment activities. The children who do not need help at this time may be interested in working with the materials on the game table, or in making number story cards for the new facts.

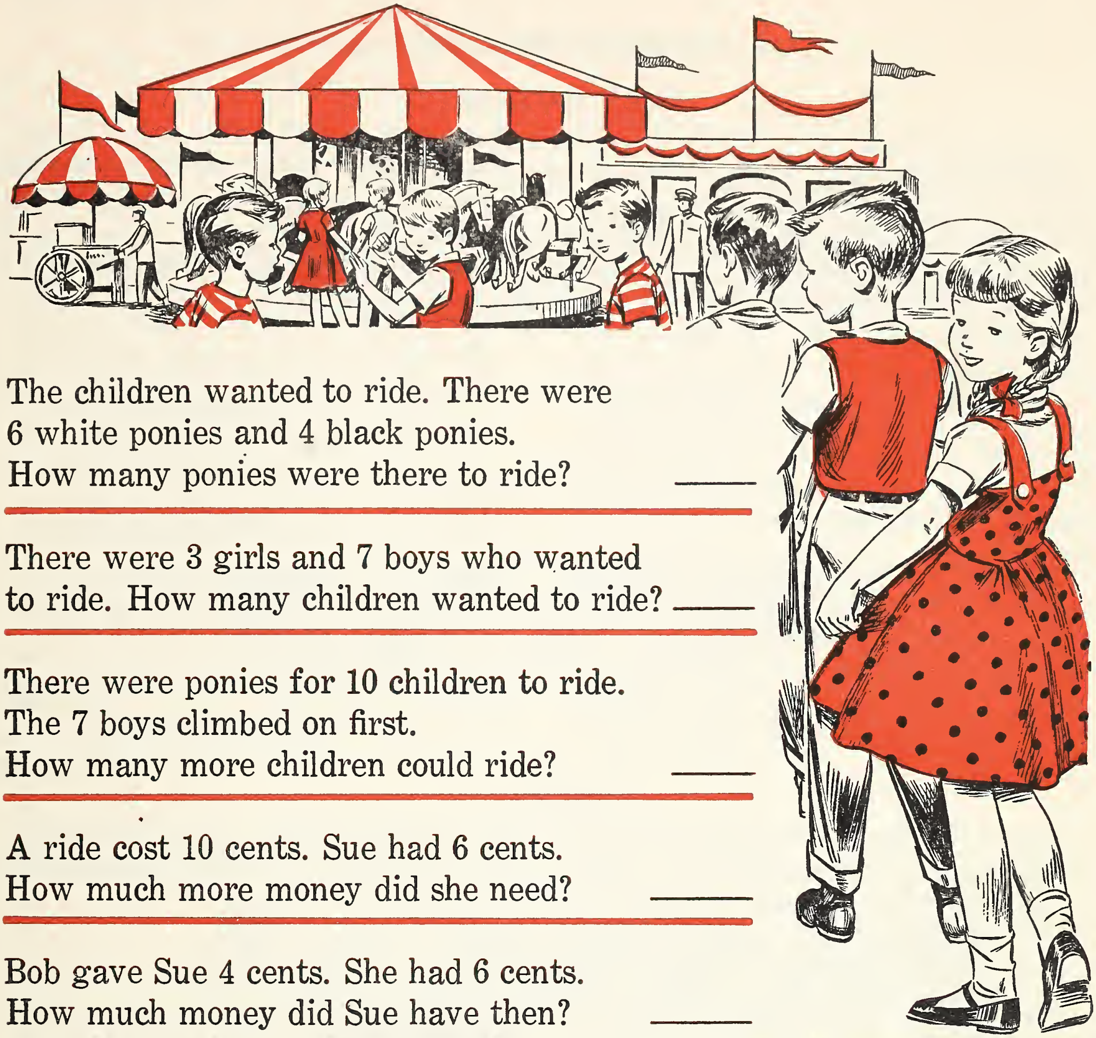
The teacher may wish to mimeograph an exercise using arithmetical terms which have been developed. The children can tell or show by drawing what the terms mean if space is left for the response. The following directions are appropriate:

Draw a row of five things. Tell which is first, second, third, fourth, and fifth.

Draw a pie cut in half.

Draw a pie cut into fourths.

Draw a toy. Then draw a larger toy and a smaller toy.



The children wanted to ride. There were 6 white ponies and 4 black ponies. How many ponies were there to ride? ____

There were 3 girls and 7 boys who wanted to ride. How many children wanted to ride? ____

There were ponies for 10 children to ride. The 7 boys climbed on first. How many more children could ride? ____

A ride cost 10 cents. Sue had 6 cents. How much more money did she need? ____

Bob gave Sue 4 cents. She had 6 cents. How much money did Sue have then? ____

Add or subtract, and write the answers.

10	10	3	10	10	6	10	10	7	4
− 2	− 6	+ 7	− 8	− 3	+ 4	− 7	− 4	+ 3	+ 6

1	2	1	1	3	6	2	4	4	2
5	3	3	4	1	1	2	4	2	5
4	4	5	3	6	3	6	2	4	3

UNDERSTANDING TWO-PLACE NUMBERS

Preparatory Activities

Another type of exercise for developing an understanding of two-place numbers is provided at this time. Pictures showing tens and ones are planned to help the children find how many tens there are, how many ones there are, and what the total number is.

Using concrete objects. The teacher will find it expedient to have the pupils work with concrete objects again before they do the exercise in the pupil's book. The bundles of ten counting sticks, toothpicks, milk straws, or pegs that were suggested earlier may be used, together with single objects of the same kind.

The teacher may arrange on a table or a desk several bundles of ten objects and some single objects. The pupils may find how many tens, how many ones, and how many objects there are altogether. For example, 5 bundles of ten and 6 single objects may be used. The children count to find that there are 5 tens and 6 ones. Then they think what number means 5 tens and 6 ones. They write 56.

Then arrangements of bundles of ten objects and additional single objects, such as the following, may be displayed:

8 bundles of ten and 4 single objects
3 bundles of ten and 7 single objects
9 bundles of ten and 2 single objects
4 bundles of ten and 9 single objects
6 bundles of ten and no single objects
1 bundle of ten and 3 single objects
7 bundles of ten and 5 single objects
2 bundles of ten and 8 single objects
10 bundles of ten and no single objects
5 bundles of ten and no single objects

For each arrangement, the children count the bundles and single objects and tell what number the arrangement represents.

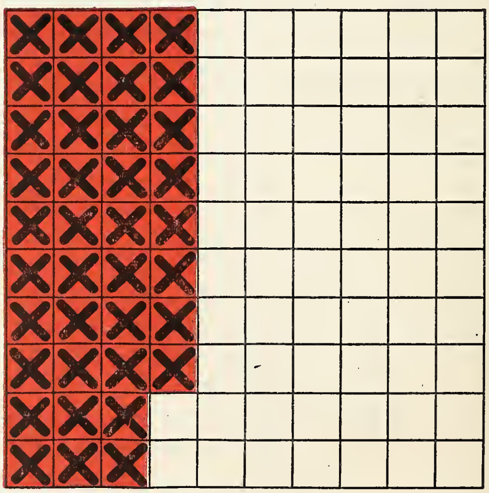
Using Page 122

The story at the top of the page sets the motive for the counting experience. After the children read and discuss the story, they may study the pictures and answer the questions. The teacher will give individual help as it is needed.

Follow-up Activities

Additional learning helps. If there are any children who had difficulty with the exercise, they may count paper for arithmetic cards into tens and additional single cards. They may count the pennies from a fund drive or from the milk or lunch fund into stacks of ten. Then the teacher may ask, "How many tens have you? How many ones? How many cards (or pennies) did you count?"

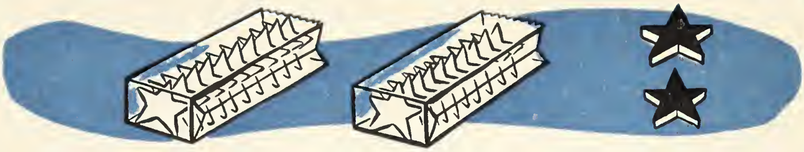
Enrichment activities. Some of the faster learners may wish to illustrate two-place numbers. One-half-inch squared paper may be prepared by mimeographing, if it is not otherwise available. The children may color or check out squares by rows or columns of ten each and some single squares. They may tell how many tens, how many ones, and how many squares they colored.



3 tens and 8 ones—38 squares

The mothers made little cakes
for the school store. The children
put them in bags. They put 10 in each bag.

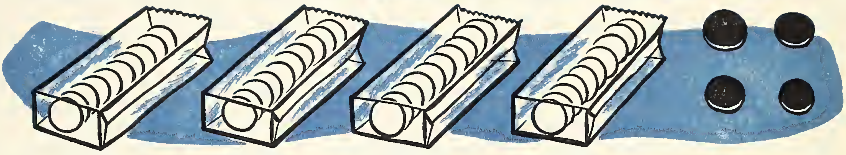
John's cakes



How many tens? ____ How many ones? ____

How many cakes did John take to school? ______

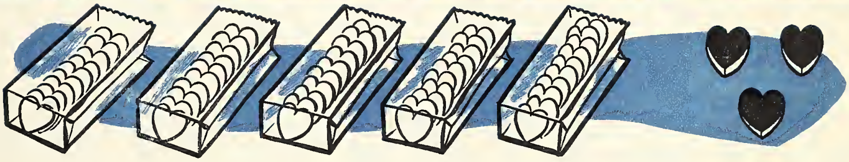
Mary's cakes



How many tens? ____ How many ones? ____

How many cakes did Mary take to school? ______

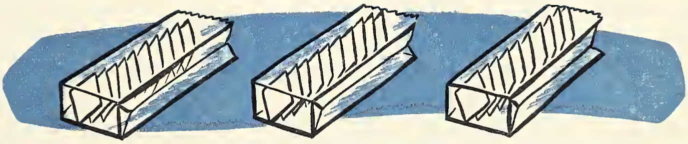
Sue's cakes



How many tens? ____ How many ones? ____

How many cakes did Sue take to school? ______

Tom's cakes



How many tens? ____ How many ones? ____

How many cakes did Tom take to school? ______

ADDING LARGER NUMBERS

Preparatory Activities

An exercise is provided at this time with number stories and examples that use two-place numbers and involve addition. Some of the stories and examples involve money.

Working out number stories together. The teacher will find it advantageous to have the children work out together a few number stories similar to those in the pupil's book. These stories, or others which are similar, may be written on the blackboard to be used as an oral group exercise:

The children are making books for their fathers and mothers. They will use colored paper for the covers. They want to know how much colored paper they have.

Bob said that there are 53 small pieces of blue paper and 26 large pieces. How many pieces of blue paper are there?

Mary said that there are 25 large pieces of green paper and 14 small pieces. How many pieces of green paper are there?

Fred said that there are 74 small pieces of red paper and 13 large pieces. How many pieces of red paper are there?

The children need ribbon for the books. The red ribbon will cost 42 cents and the yellow ribbon will cost 42 cents. How much will the ribbon cost in all?

After the children read the first story and decide how to find the answer, have a child write the example on the blackboard. Then develop through discussion where we begin to add, where we write the answer, etc.

The other stories should be worked out in the same way. As the children work with the last story, the teacher will wish to call their attention to the need to write the cent sign when the number means money.

Using Page 123

The picture may be used as a means of motivating interest in the number stories. Then the children may read the stories and find the answers independently. The teacher will, of course, be ready to give help whenever individuals seem to need it.

The children may then read the direction above the examples and do them.

Follow-up Activities

Children, as much as adults, need to develop a genuine appreciation of a job well done and a deep sense of responsibility for doing their very best work. Evaluating the work done in such exercises as those on page 123 helps to develop these attitudes in children.

As has been suggested before, the teacher and children should work together to evaluate the work. Each child should help check his own work. For example, the group may discuss each number story and one child may read the answer. Then, if someone has a different answer, he may read it. The example may be worked at the blackboard to find which answer is correct. The children who had the correct answer may put a mark beside it to indicate that it is correct. Those who did not have the correct answer may wait until the teacher helps them to correct their mistake. The examples may be checked in a similar way. But each child should make a list of the facts that caused him trouble.

Additional learning helps. The teacher will work with the children who need more help with number stories. She will help them think through the stories in the pupil's book. Then they may correct their mistakes.

The children who missed addition and subtraction facts may use their counting objects, the group cards, and the study and practice cards to learn the facts they missed.

Enrichment activities. The faster learners may choose other work at this time. Perhaps some of them will be interested in working with the materials for fractions at the arithmetic table.

One day 63 children had pony rides after school. That night, 35 children had rides. How many children had pony rides?

The next day 51 boys and 48 girls had pony rides. How many children went for pony rides that day?

John paid 35 cents for a pony ride. He paid 12 cents for an apple and some milk. How much money did John pay in all?

Write the cent sign after each number that means money.

Ted paid 31 cents for things to eat and 35 cents for a pony ride. How much money did Ted pay in all?

Add, and write the answers.

41 34	15 14	51¢ 37¢	23 42	74 15	41¢ 22¢	62 35	21¢ 26¢
63 24	25 61	84¢ 14¢	32 53	24 11	62¢ 17¢	53 26	71¢ 23¢

USING COLUMN ADDITION IN NUMBER STORIES

Preparatory Activities

At this time a practice exercise is provided in reading and interpreting number stories that involve column addition.

Working out number stories together. The teacher may wish to remind the children about writing the numbers from the number stories in a column and also about beginning at the top and adding down. Such reminders may prevent some children from making mistakes in all of their work.

If such reminders seem necessary, these number stories may be used as a group exercise to be worked out at the blackboard:

One day Bob's father gave him 2 green cars. Bob had 4 red cars and 4 yellow cars. How many cars did he have altogether?

Mary had 4 baby dolls, 3 girl dolls, and 3 boy dolls. How many dolls did she have in all?

Tom read 2 books about pets, 6 about wild animals, and 2 about farm animals. How many books about animals did Tom read?

Using Page 124

The children may discuss the picture to find what the number stories are about. Then they may read the stories independently and find the answers. The teacher will be interested in observing the children as they work to learn about their work habits, and also to be ready to give help if any child needs it.

Follow-up Activities

Often children grow more from discovering their mistakes and from learning why they made them than from all the reteaching the teacher may provide. The exercise in the pupil's book offers several opportunities for mistakes which the teacher and children may overlook unless a careful evaluation is made.

The teacher and children may work together to find which answers are correct and which are incorrect. Each child may write at the top of the page, as his score, the number of correct answers on the page.

Then the teacher will be interested in finding how well the children succeeded in writing the numbers in the columns in the order in which they occur in the stories. Each child can check his own paper if the teacher writes the examples on the blackboard. Any children who made mistakes may rewrite the examples, putting the numbers in the correct order. The children should be told that the answer is the same regardless of the order, but that the same facts are not used to find the answer if the order of the numbers is different. This can be demonstrated if the teacher wishes.

Since so many mistakes are made in arithmetic because the figures are formed poorly, the teacher will be interested in finding how well the children wrote the examples. This will be a matter of examining the children's books individually. The children whose work seems carelessly done may be asked to try again to write the examples. If some children need help in forming the figures, that help should be given later.

Additional learning helps. After the general evaluation, the teacher will wish to call together the children who need help with column addition. The work of these children must be analyzed individually by having them add orally so the teacher will know which facts caused trouble, and what other difficulties, if any, they encountered.

The facts that were missed by each child may be studied in the usual way.

Enrichment activities. The faster learners may choose other work to do at this time. Perhaps some of them may want to work in pairs to see if they know all of the 45 addition and the 45 subtraction facts. The study and practice cards from the arithmetic table may be used.

The children were looking
for signs of spring.
Mary found 3 blue flowers,
1 red flower, and 5 yellow flowers.
How many flowers did she find?

Ruth saw 3 baby frogs, 3 baby ducks,
and 4 baby turtles.
How many baby animals did Ruth see?

Bob saw 1 red bird, 3 blue birds,
and 6 brown birds.
How many birds did Bob see?

Dick saw 2 boys playing with boats,
6 boys playing ball,
and 2 boys fishing.
How many boys did he see?

READING LARGER NUMBERS

Preparatory Activities

At this time a practice exercise in reading large numbers is provided. The exercise is functional in that it helps the children learn about a table of contents and how it is used.

Using realistic experiences. The teacher can best prepare the children for the exercise in their books by having them study the table of contents in a reader or story book. She should explain what it is and how it is used, unless that has already been done.

The children may read the titles of the stories in order and tell the page on which each story begins. Then they may turn to the page in the book and find the story.

Next, a child may be asked to name a story in the book. The other children may locate the story in the table of contents, and then turn to it in the book. Several such experiences may be provided.

Such sentences and questions as these may be written on the blackboard for the children to read.

Mary's book has 188 pages. John's book has 164 pages. Whose book has more pages?

Each child may be given a library or story book. In turn they may write on the blackboard a number that shows the page on which a story begins, or the number of pages in the book. The other children may take turns reading the numbers.

Care must be taken to have the children read the numbers correctly. They should learn to pronounce difficult words such as *hundred, seventy, ninety,* and *eighty* clearly and correctly. They must learn also to omit "and" when reading such numbers as 152. As was explained previously, this number should be read, "one hundred fifty-two," *not* "one hundred *and* fifty-two."

Using Page 125

The children may discuss the kind of book that is shown. Then they may read the directions at the top of the page. After they have read the list of stories and the page numbers, they may read the directions below the picture and write the page numbers.

Following this, the teacher may ask such questions as these:

Does the story *The Big Elephant* come before *The Little Hen?* What story comes after *The Brown Bear? The Little Hen* is the last story. What story is next to last?

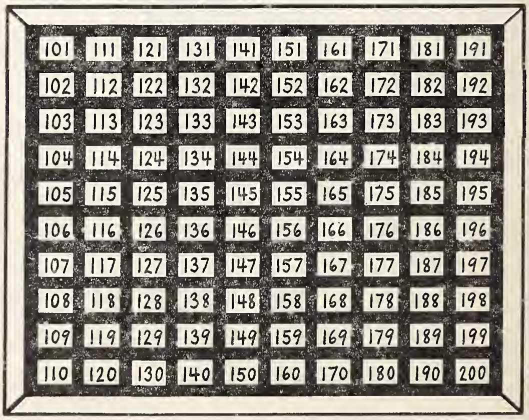
Then she may ask other questions related to the ordinals, as, for example:

What is the second story? the fifth story? the third story? the fourth story?

Follow-up Activities

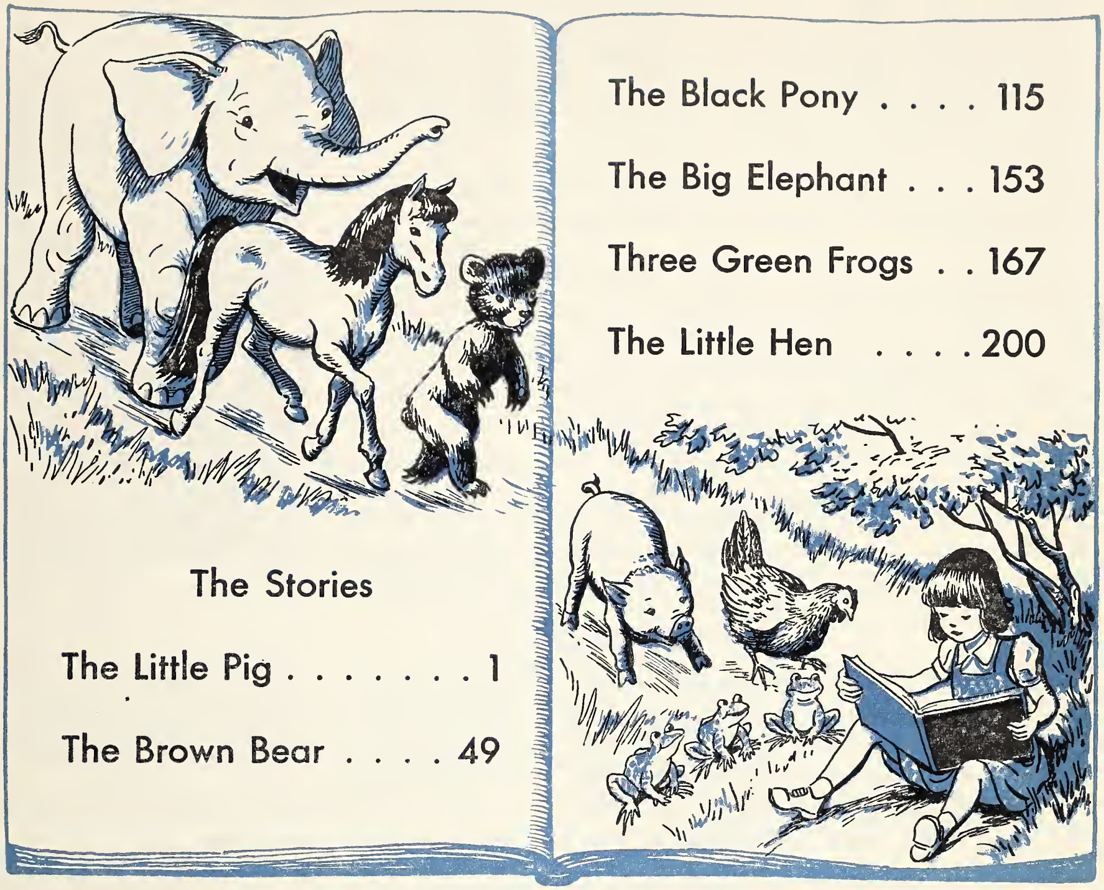
Additional learning helps. If some of the children demonstrated that they need more help, they may be given an opportunity to arrange the numbers in sequence. A box lid or a picture frame that will hold 100 small cards or one-inch counting cubes may be provided. If the box lid or frame is not available, the cards may be arranged on top of the child's desk.

Write the numbers 101 to 200, one number on each card. Then have the children arrange the cards in columns of ten in sequence from 101 to 110, 111 to 120, etc., as shown in the next column.



101	111	121	131	141	151	161	171	181	191
102	112	122	132	142	152	162	172	182	192
103	113	123	133	143	153	163	173	183	193
104	114	124	134	144	154	164	174	184	194
105	115	125	135	145	155	165	175	185	195
106	116	126	136	146	156	166	176	186	196
107	117	127	137	147	157	167	177	187	197
108	118	128	138	148	158	168	178	188	198
109	119	129	139	149	159	169	179	189	199
110	120	130	140	150	160	170	180	190	200

Read these pages from Mary's story book.
Find where each story begins.



The Stories

The Little Pig 1

The Brown Bear 49

The Black Pony 115

The Big Elephant . . . 153

Three Green Frogs . . 167

The Little Hen 200

Tell where "The Black Pony" begins. Page________

Tell where "The Big Elephant" begins. Page________

Tell where "The Brown Bear" begins. Page________

Tell where "Three Green Frogs" begins. Page________

Where does the first story begin? Page________

Where does the next story begin? Page________

Where does the last story begin? Page________

USING ADDITION AND SUBTRACTION IN NUMBER STORIES AND EXAMPLES

Preparatory Activities

Another opportunity for practice in problem solving, in simple addition and subtraction, and in column addition is provided on page 126. The comparison type of subtraction situation is involved in one of the number stories.

Learning to interpret number stories. The teacher will probably welcome another opportunity to give some guidance in reading and interpreting number stories. Appropriate stories arising out of classroom activities or the stories given below may be written on the blackboard and used as an oral exercise in which the whole group will participate. The children may be advised to think what happens in the stories and what the questions ask, both while they are reading the stories, and again after they have read them.

Mary was helping her mother with the work. She went to the store to buy apples for pies.

Mary got 9 big apples and 4 little apples. How many more big apples than little apples did she get?

Mary saw 8 eggs in a box. She gave her mother 2 of the eggs to make some cookies. How many eggs were in the box then?

There were 4 cookies in the pan. Mary put 6 more cookies in the pan. How many cookies were in the pan then?

Mary's mother said that 3 boys and 4 girls were coming for lunch. How many children were coming?

Using Page 126

After the children look at the picture and find what the number stories are about, they may read them and find the answers. It may help to suggest that they think about the stories and the story questions again after they have read them, and then decide what to do to find the answer. The children should be able to do the work independently. But if individuals have difficulty the teacher will give them help.

Then the directions above the examples may be read and followed.

Follow-up Activities

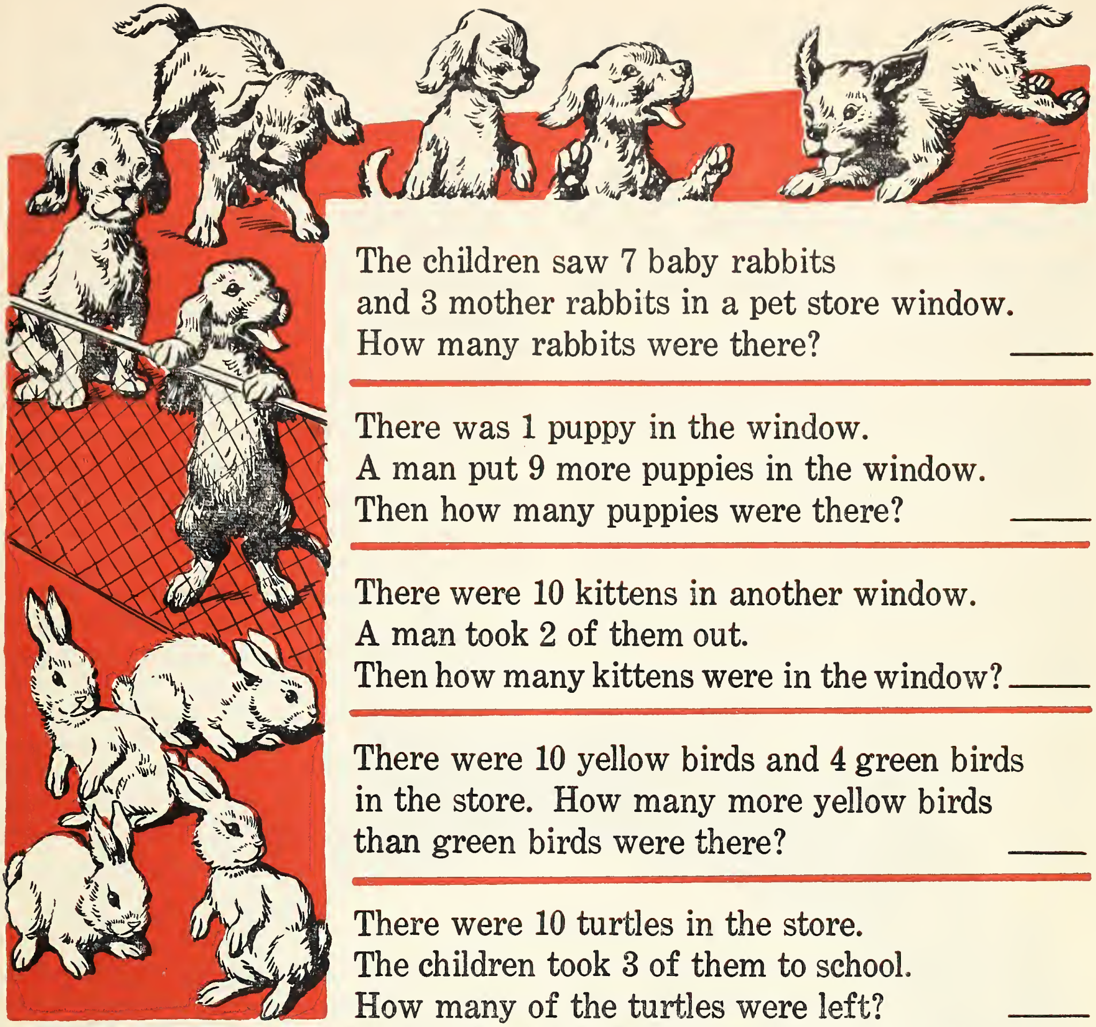
The teacher will help the children find which of the problems they solved correctly and which examples they did correctly. Then they may find what was the cause of the trouble if some of the problems or examples were not solved correctly. Each child may make a list of the addition and subtraction facts that he needs to study. The teacher will help him make the list.

Additional learning helps. The children who missed some of the number stories will work with the teacher while the stories are read and discussed, and mistakes are corrected. Then these children may be given other stories to read and interpret.

If some of the children need help with the addition and subtraction facts, they may use the illustrated group cards, the counting objects, and the study and practice cards to find the correct answers. When they are sure of the answers, they may write the facts two or three times.

If the column addition process, rather than the addition facts, caused difficulty for any of the children, they may dramatize a story or two that involve column addition. Then they may use their concrete objects to illustrate the examples and learn how to add a column of three numbers.

Enrichment activities. The children who do not need help may wish to play banker. They may use the toy money to play the game, and exchange pennies for nickels, dimes, quarters, or half dollars; nickels for dimes or quarters; dimes for half dollars or one-dollar bills.



The children saw 7 baby rabbits
and 3 mother rabbits in a pet store window.
How many rabbits were there? ____

There was 1 puppy in the window.
A man put 9 more puppies in the window.
Then how many puppies were there? ____

There were 10 kittens in another window.
A man took 2 of them out.
Then how many kittens were in the window? ____

There were 10 yellow birds and 4 green birds
in the store. How many more yellow birds
than green birds were there? ____

There were 10 turtles in the store.
The children took 3 of them to school.
How many of the turtles were left? ____

Add or subtract, and write the answers.

4	9	7	10	10	6	10	9	3	10
+ 6	− 5	+ 3	− 6	− 3	+ 4	− 7	− 4	+ 7	− 4

4	1	3	5	3	2	1	4	6	2
1	6	2	1	4	2	2	5	3	4
4	3	2	4	3	4	7	1	1	4

LEARNING ABOUT THE FRACTION *ONE-THIRD*

Preparatory Activities

The exercise on page 127 is designed to help the pupils understand these three related ideas: (1) to have thirds of something it must be cut into three pieces; (2) one piece must be just as large as each of the other pieces; (3) each piece is one-third of the whole thing.

Experiences with halves and fourths were provided earlier. The concepts developed are reviewed and practice is provided again on this page.

Providing concrete experiences. To help the children develop more accurate concepts of one-third, the teacher should give them experiences in dividing things into thirds, and in seeing a number of concrete materials divided into thirds. The following suggestions may be helpful:

Sheets of paper, strings, or ribbons may be folded by the pupils into three parts that are equal, and then be cut into thirds. By folding, it is possible to see that the three parts are identical in size. The teacher should emphasize the ideas to be developed by asking these questions:

How many pieces are there? Is one piece just as large as each of the other pieces? What is each piece called?

Someone may bring to class a measuring cup that has thirds indicated on it. An experiment may be performed in which the measuring cup is filled one-third full of water three times, the water being transferred to another container each time. When the water is poured back into the cup, the pupils can observe that the cup is filled.

The teacher may divide apples, candy bars, or cup cakes into thirds. The children can compare the pieces to get the concept that the pieces are equal.

The teacher may divide paper pie plates, and rectangles, squares, and circles of paper into thirds, coloring each third with a different color and marking each piece *one-third*, using the words, not the symbols. These materials may be handled by the children and discussed. The concept that one-third of an object is just as large as each other third of that object, no matter what the object may be, can be reinforced in this way.

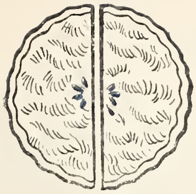
Using Page 127

Call attention to each pie and have the children find and write the answer or circle the word *Yes* or *No*. Then help the children name the things in the picture below. Have them find and read the words *halves, thirds,* and *fourths*. Explain that they are to draw lines from the word *thirds* to each thing that is cut into thirds; from the word *halves* to each thing that is cut into halves; and from the word *fourths* to each thing that is cut into fourths. Have them trace the dotted line and proceed independently.

Follow-up Activities

Additional learning helps. The slower learners may be given sheets of paper on which lines have been drawn to divide them into thirds. Circles of paper with similar lines may be provided also. The children may cut the papers into thirds by cutting along the lines. Then they may tell how many pieces they have made of each whole sheet of paper. They may lay one piece over the other to see that each piece is as large as each of the other pieces. They may be given whole sheets of paper or paper circles just like those they have cut. By placing the pieces—the thirds—on the whole sheet, they may be helped to see more clearly that each piece is one-third of the whole thing.

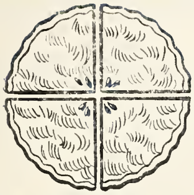
Enrichment activities. The faster learners may find pictures in magazines that show things divided into thirds. Or they may be given a long piece of wrapping paper to fold into thirds to make three pictures about a story they have read.



How many pieces? ____

Are the pieces the same size? Yes No

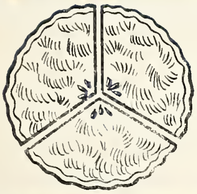
Is each piece one-half of the pie? Yes No



How many pieces? ____

Are all the pieces the same size? Yes No

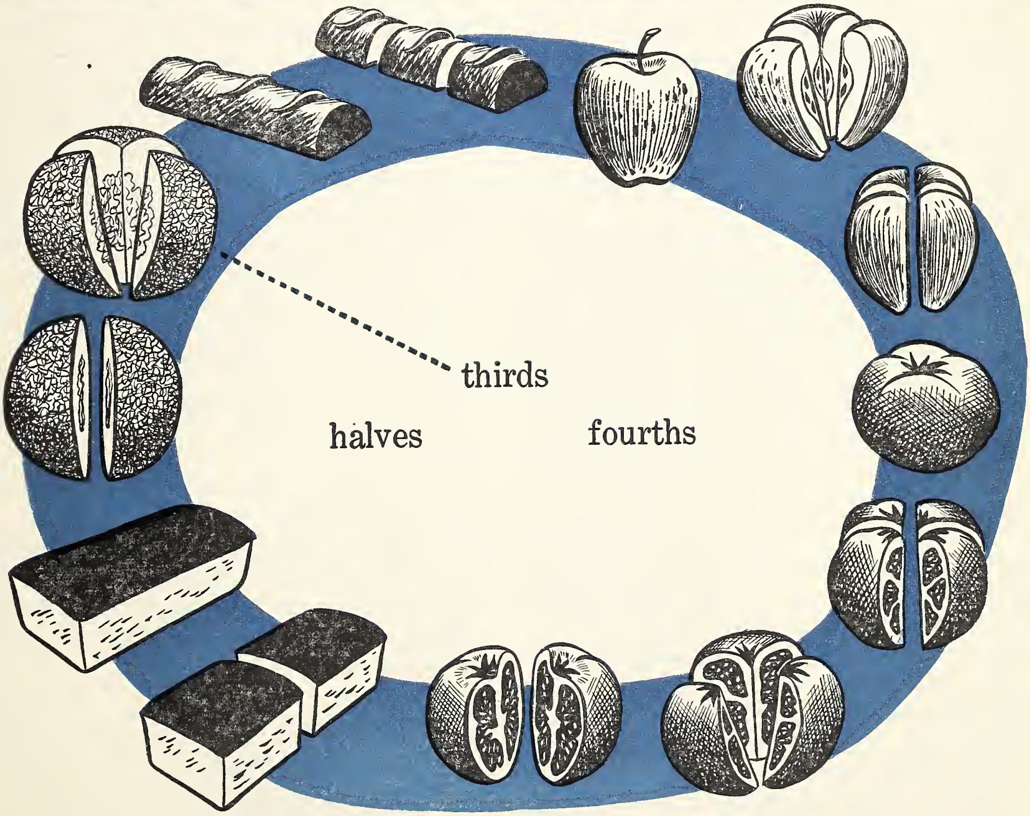
Is each piece one-fourth of the pie? Yes No



How many pieces? ____

Are all the pieces the same size? Yes No

Each piece is one-third of the pie.



MAKING SURE OF THE FORTY-FIVE ADDITION FACTS

Preparatory Activities

The sixth in the series of "Making Sure" tests is provided on page 128. The test includes three number stories that involve simple addition. All of the 45 addition facts are used in the examples.

Since this is a test, no preparatory activities are necessary except to tell the children that today they will have a chance to write the answers for all of the addition facts that they have learned this year.

Using Page 128

The teacher should read the direction line above the examples and make sure the children understand that they are to add, since the examples have no signs. (Recently the simple addition examples have had the sign + in them because the exercises included subtraction also.) Then the children may do the entire exercise independently. The teacher may observe them at work and give encouragement, if needed, but no help.

Follow-up Activities

The teacher will wish to make a very careful check of each child's work to find: (1) the facts he has learned; (2) the facts he is not sure of; and (3) which, if any, of the number stories he had difficulty with. This record can probably be made best on a file card which is dated, or on a page in a looseleaf notebook set aside for the child. If such a record was started earlier and has been added to from time to time, this will be the sixth test report the child's record will show. If such a record has been kept, a study of it will help the teacher evaluate today's test results as part of his record of growth through the year. She will know from the record whether his mistakes on this test, if he made any, are inconsistent with his previous record and therefore possibly due to a temporary distraction or disturbance, or whether they fit into a picture of partial learning and indicate the need for relearning.

The teacher will wish to tabulate the mistakes for the class as a whole, fact by fact, to find which, if any, of the 45 addition facts should be emphasized in the days ahead.

In addition to this, she will wish to make notes regarding problem solving. From these notes she will be able to plan the next learning steps for individual children and for the class as a whole.

Additional learning helps. If there are any children who confuse addition and subtraction situations in number stories, or if they try to subtract when they should add in examples, they should have another chance to learn. This means presenting again the processes in realistic situations with dramatizations and the use of concrete materials. If these are immature children, another chance—a new view—may be all they need.

If a few children have not learned some of the facts, each child should be given a list of the facts he needs to study and helped to develop them again with concrete objects. Then the study cards may be used again before practice in writing the facts.

Enrichment activities. The children who do not need help may list the addition facts which use only two numbers—the doubles: $1 + 1 = 2$; $2 + 2 = 4$; $3 + 3 = 6$; $4 + 4 = 8$; $5 + 5 = 10$.

The children are now only a short step from multiplication—which is another way of adding. The teacher may ask the children to build the doubles with counting objects. Then she may ask questions about the doubles as illustrated below, and get the kind of response shown at the right.

How many 5's are 10?

$$\begin{array}{r}5\\ \underline{5}\\ 10\end{array}$$

Two 5's are 10.

Two boys were playing with a goat and wagon.
Then 8 more boys came to play.
How many boys were playing in all? ____

Ted had 4 toy airplanes.
He made 6 more airplanes.
How many airplanes did Ted have then? ____

Betty had 3 cents.
Mother gave her 7 cents.
Then how much money did Betty have? ____

Add, and write the answers.

3	7	1	2	6	4	1	5	4
1	2	1	4	3	4	9	4	1
8	3	1	2	4	1	3	6	2
2	2	8	5	5	2	5	2	2
7	2	5	1	3	7	2	4	1
1	6	3	7	3	3	1	6	3
3	9	1	5	4	1	3	5	2
4	1	4	5	2	6	6	1	7
8	3	6	2	5	2	6	1	4
1	7	1	3	2	8	4	5	3

MAKING SURE OF THE FORTY-FIVE SUBTRACTION FACTS

Preparatory Activities

The seventh in the series of "Making Sure" tests occurs on page 129. The test includes three number stories involving subtraction, and a set of examples that use all 45 of the subtraction facts introduced in Grade Two.

No preparatory activities are necessary, except to tell the children that they will be given an opportunity to write the answers for all of the subtraction facts that they have learned during the year.

Using Page 129

Tell the children that they will work independently. Remind them that although there are no signs in the examples, they are to subtract and write the answers.

The teacher will have an opportunity to observe the work habits of the children. Since this is a test, she will not wish to help them with the work.

Follow-up Activities

The same careful diagnosis that was suggested for the preceding test should be made of the children's work on this test. The teacher will wish to know which facts each child has learned and which he has yet to learn. She will wish to know also which facts, if there are any, should be introduced again for the whole group. In addition to these things, she will need to know if there are any children who confuse the two processes or who cannot interpret number stories well enough to be sure which process is to be used to find the answer. As was suggested earlier, an item by item check and an individual record for each child will give her this information.

Additional learning helps. If some of the slower learners cannot differentiate between addition and subtraction situations well enough to recognize which number stories involve addition and which involve subtraction, they should be given experiences again in dramatizing related number stories in which the situations are reversed. Stories such as the following are appropriate:

Tom was playing with 2 puppies. John brought 4 more puppies. How many puppies were there then?

The boys were playing with 6 puppies. John took 4 puppies home. How many puppies were there then?

Having the child change the story, so that the reverse process is involved, frequently helps him to get at the heart of the situation. The following story will serve as an example:

Change this story so that you will add to find the answer: Mary had 7 small cakes. She gave 2 cakes to Susan. How many cakes did Mary have then?

If there are subtraction facts which some children do not know, they should be introduced again with the same learning procedure that was used before—dramatization of a story involving the fact, building the fact with concrete objects, using the fact in an action story that can be illustrated, stating the fact from a picture, and writing the fact.

Enrichment activities. Those children who do not need help may find it interesting to see a different kind of relationship among the facts. The following is suggested:

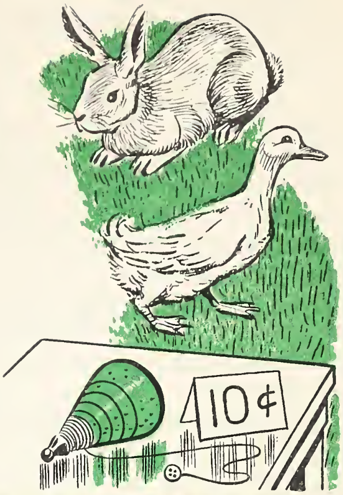
● ● ● ● ● ● ● ● ●   ● $9 + 1 = 10; 10 - 1 = 9$
● ● ● ● ● ● ● ●   ● ● $8 + 2 = 10; 10 - 2 = 8$
● ● ● ● ● ● ●   ● ● ● $7 + 3 = 10; 10 - 3 = 7$
● ● ● ● ● ●   ● ● ● ● $6 + 4 = 10; 10 - 4 = 6$
● ● ● ● ●   ● ● ● ● ● $5 + 5 = 10; 10 - 5 = 5$
● ● ● ●   ● ● ● ● ● ● $4 + 6 = 10; 10 - 6 = 4$
● ● ●   ● ● ● ● ● ● ● $3 + 7 = 10; 10 - 7 = 3$
● ●   ● ● ● ● ● ● ● ● $2 + 8 = 10; 10 - 8 = 2$
●   ● ● ● ● ● ● ● ● ● $1 + 9 = 10; 10 - 9 = 1$

After developing this chart, the children may make charts for facts having sums or minuends of 9, 8, 7, 6, 5, 4, 3, and 2.

Dick had 10 pet rabbits.
He gave 8 of them to Bob.
How many rabbits did Dick have then? _____

Jane had 10 ducks. Sue had 6 ducks.
How many more ducks
did Jane have than Sue? _____

Ruth wants to buy a top that costs 10¢.
She has 1¢. How much more money
does she need? _____



Subtract, and write the answers.

6 2	9 8	8 5	2 1	7 4	9 6	7 1	4 3	10 7
3 1	8 4	5 2	9 5	8 7	7 2	6 4	10 6	5 3
10 5	6 3	8 1	5 4	4 1	8 6	10 8	9 4	8 2
7 6	9 1	10 3	4 2	7 3	9 2	10 4	5 1	7 5
10 2	9 7	6 1	8 3	3 2	10 1	9 3	6 5	10 9

LEARNING TO SUBTRACT LARGER NUMBERS

Preparatory Activities

Now that addition of two-place numbers whose sums do not exceed 99 has been taught, comparable subtraction examples whose minuends do not exceed 99 may be introduced. Pages 130 and 131 of the pupil's book provide number stories involving the subtraction of two-place numbers which are to be used to develop this step in subtraction. The stories include three basic subtraction concepts—how many are left, how many more are needed, and how many more is one number than another. When quantities of money, etc., are involved, these basic concepts become—how *much* is left, how *much* more is needed, and how *much* more is one quantity than another.

The introduction should be made through a number story of the "how many are left" type:

There were 86 children watching the animals in the zoo. Soon 34 of them had to go home. How many children were watching the animals then?

The teacher will write on the blackboard:

86 means 8 tens and 6 ones
34 means 3 tens and 4 ones

Since in this subtraction type only the minuend is illustrated, the children may arrange on a table 8 bundles of 10 counting sticks and 6 single sticks. Then the teacher will explain that we begin at the right, just as we do in addition, and subtract the ones. A child may take 4 sticks from the 6 single sticks, note that 2 remain, and write 2 in the example under "4 ones."

Next, the teacher will explain that now we subtract the tens. A child may take 3 tens (3 bundles) from the 8 tens (8 bundles). He may write the 5 in the example just under "3 tens."

The example may be written again, and the children told that we begin to subtract at the right, just as we begin to add two-place numbers at the right. We subtract the ones. We write the number in the answer just below the ones.

$$\begin{array}{r}86\\ \underline{34}\\ 52\end{array}$$

Then we subtract the tens and write this number in the answer just below the tens.

Finally, we answer the question in the number story: There were 52 children watching the animals then.

We may develop an example with money also. This story may be used:

Fred had 69 cents. He spent 25 cents at the zoo. How much money did he have left?

The children may use 6 dimes and 9 pennies to show what the numbers mean. Then they may take away 5 pennies and 2 dimes. Next they may be shown how to write the example with the cent sign and subtract.

This story may be used to demonstrate the "how many more" concept of subtraction:

There were 85 animals and 62 birds in the zoo. How many more animals than birds were there?

Write the example on the blackboard and let a child subtract and write the answer.

This number story may be used to develop the "how many more is needed" concept of subtraction:

The children needed 98 place cards for a party. They had 74 cards which they had made. How many more place cards did the children need?

The example may be put on the blackboard. The children may find the answer, and read the answer to the question in the number story.

Using Page 130

After the children discover from the picture that this is a school toy sale, they may read the first two stories and work the model examples under teacher supervision.

Then they may read the next two stories and work out the answers independently. The teacher will give help as it is needed by individuals. They should be reminded to write the numbers one under the other before they find the answers.

The children made 67 toys for their store.
They sold 53 of the toys.
How many of the toys were left?

Begin with the ones.
Subtract 3 from 7.
Write the 4 under the ones.
Next, subtract 5 from 6.
Write the 1 under the tens.

$$\begin{array}{r} 6\ 7 \\ \underline{5\ 3} \\ 14 \end{array}$$

____ toys were left

Jane had 38 cents.
She paid 12 cents for a doll.
How much of her money was left?

The answer means cents.
Put the cent sign after the answer.

$$\begin{array}{r} 38¢ \\ \underline{12¢} \end{array}$$

Tom had 47 cents.
He paid 25 cents for toys.
How much money did he have then?

Sue had 59 cents.
She paid 41 cents for toys.
Then how much money did she have?

Learning to Subtract Larger Numbers (continued)

Using Page 131

The number stories on this page should cause no difficulty. The children may read them and find the answers independently. The teacher will, of course, observe carefully and give help where it is needed by individuals. One thing she will watch especially is to see that the children begin at the right to subtract. This important habit must be developed from the very first.

The children may then read the directions above the examples and follow them. Again the teacher will observe as the children work independently. She will give help as it is needed.

Follow-up Activities

The teacher will wish to look over the children's work very carefully to find who had difficulty and who understands the new step in subtraction. At this time the evaluation should be done by the teacher, rather than by the teacher and children together. For this reason the follow-up activities will probably have to be provided the next day.

Additional learning helps. The children who need help with subtraction of two-place numbers may be given more experiences with concrete materials and also more demonstrations of how we subtract in such examples. The stories in the book may be used again if the children had difficulty with them. It should be remembered that the *minuend only* can be illustrated in the situations using the "how many left" concept. *Both* the minuend and the subtrahend can be illustrated in the "how many more is one number than another" situation. *Only the subtrahend* can be illustrated in the "how many more are needed" type of situation, and no attempt should be made to illustrate the minuend.

The teacher may wish to provide additional help for any children who had difficulty with the "how many more" or "how much more" concept of subtraction. The following number story may be used to illustrate the "how much more" situation.

Tom had 48 cents. Bob had 26 cents. How much more money did Tom have than Bob?

The children may use 4 dimes and 8 pennies to show Tom's money, and 2 dimes and 6 pennies to illustrate Bob's money. After they have compared the amounts of money and found that Tom had 22 cents more than Bob, they may write the example and work it cooperatively by subtracting.

A similar procedure may be followed for the "how many more" situation, using counting sticks in bundles of 10 and single sticks. This story may be used:

Mary made 38 cards for her friends. Sue made 23 cards. How many more cards did Mary make than Sue?

For the "how many more are needed" concept, the following story may be used:

One day 35 mothers and fathers came to visit. There were chairs enough for 22 mothers and fathers. How many more chairs were needed?

The example may be written as shown:

35 means 3 tens and 5 ones
22 means 2 tens and 2 ones

They needed 1 ten and 3 ones, or 13 chairs

Then the example may be written again, without the analysis, and the answer found.

For the "how much more is needed" situation, a problem involving money may be used.

If the subtraction facts caused trouble, each child may be given a list of those facts he needs to learn. He may then be helped to work them out concretely, use the illustrated study cards to learn them, and finally practise writing the facts he missed.

Enrichment activities. The faster learners may be interested in writing number stories involving subtraction of two-place numbers.

Mary and Bob need 36 toys for a party.
They got 15 toys at the toy store.
How many more toys do they need?

Bob paid 97 cents for toys.
Mary paid 61 cents.
How much more did Bob pay than Mary?

Mother wants to make 76 little cakes
for the party. She has made 42 of them.
How many more cakes does she need to make?

Mary and Bob need 38 party hats.
They have made 26 of them.
How many more hats do they need to make?

Subtract. Begin at the right each time.

57	97¢	28	76	95¢	87	69	85¢
33	26¢	13	21	41¢	15	46	74¢

88	48¢	67	49	99¢	95	39	94¢
24	25¢	31	15	53¢	72	11	83¢

USING ADDITION AND SUBTRACTION IN NUMBER STORIES AND EXAMPLES

Preparatory Activities

The pupils are given another opportunity to read and interpret number stories involving simple addition and subtraction and column addition. Practice examples in addition, subtraction, and column addition are provided.

Interpreting problems orally. It may be that the children will not need a guided exercise in problem solving before they read the number stories on page 132. However, if the teacher feels it is a good idea to provide experience in solving some problems together, these stories may be used:

Tim counted the horses he saw as he was riding in the car. There were 3 black horses, 2 white horses, and 4 brown horses. How many horses did Tim count?

Tim saw a large truck with new cars on it. There were 2 black cars, 1 green car, and 2 red cars. How many cars were there?

Tim counted the sandwiches in the picnic basket. There were 10 meat sandwiches and 5 egg sandwiches in the picnic basket. How many more meat sandwiches than egg sandwiches were there?

There were 7 boys and 2 girls swinging at the picnic grounds. How many children were swinging?

Using Page 132

The teacher may need to tell the children that May baskets are sometimes made by children to put on the door steps of friends' houses on May Day—May 1. The baskets are filled with various kinds of flowers, tastefully arranged.

The children may read the number stories and find the answers independently. Then they may read the directions above the examples and follow them. The teacher will give help only as it is needed by the less independent workers.

Follow-up Activities

This is another exercise which the teacher and children may well evaluate together. As the teacher directs the evaluation, each child finds which stories and examples he worked correctly and those with which he needs more help.

Additional learning helps. The children who need help with the number stories which they missed may read them together and find what the stories tell and what the questions ask. Then each child may try again to find the answers for the questions he found difficult. The teacher may wish to have these children read and interpret other number stories which are similar to those in the book.

The children who have a list of addition and subtraction facts which caused them trouble may work with concrete objects to build the facts, use the illustrated study and practice cards, and write the facts.

Enrichment activities. The faster learners may be given an exercise in following directions and using arithmetical terms they have learned. The teacher may write on the blackboard these directions:

Draw a picture. Put a house on the left. Put a tree on the right.

Draw a group of pets. Then draw a smaller group and a larger group of pets.

Draw a pie. Color one-half of it red.

Draw a cake. Color one-fourth of it yellow.

Draw a long box. Color one-third of it green.

Draw five toys in a row.
Color the first toy red.
Color the fifth toy green.
Color the third toy blue.
Color the second toy yellow.
Color the fourth toy black.

The children made some May baskets.
Betty made 2 baskets.
Jane made 4 and Sue made 4.
How many baskets did the girls make?

The girls put 5 red flowers, 4 blue flowers, and 1 yellow flower in each basket.
How many flowers did they put in each basket?

The boys had 9 boxes. They made May baskets with 4 of the boxes.
How many boxes were left? ____

The girls made 10 May baskets.
The boys made 4. How many more baskets did the girls make than the boys? ____

Add or subtract, and write the answers.

10	7	10	4	10	8	3	9	10	6
−6	+3	−2	+6	−7	−5	+7	−3	−3	+4

3	1	2	2	2	1	2	1	2	1
3	2	3	1	2	3	1	7	7	1
4	6	3	7	5	6	5	2	1	8

LEARNING MORE ABOUT COUNTING MONEY

Preparatory Activities

The children have learned to count by ones, twos, fives, and tens, but they have not had experience in counting more than one way in a single exercise; for example, counting by fives to 20 and by ones from 20 to 25; or by tens to 20 and by fives from 20 to 25. This is the new step to be introduced on page 133. The exercise also helps to prepare the children for the next step in counting, which is counting change.

Using concrete materials. Toy money or, preferably, actual coins may be used to introduce this learning step. As a review, the children should count pennies by ones to 20, then by twos to 20. Then they should count nickels as fives from 5 to 25 and dimes as tens from 10 to 50. If each child has a collection of toy money which he has made, he may practise counting at his desk.

Then the teacher may place on her desk 4 nickels and several pennies. She may ask one child after another to count the nickels as fives and the pennies as ones to find how much money there is altogether.

Next, 3 nickels and 2 pennies may be counted in the same way. Then 2 dimes and 1 nickel may be counted as tens and fives. Finally, 1 dime, 2 nickels, and 5 pennies may be counted as 1 ten, 2 fives, and 5 ones.

The pupils must get the concept that the last number they say tells how much money they counted, *not* how many coins.

Using Page 133

This page should be used as a group exercise with the children discussing the picture of 10 groups of 2 pennies and reading the directions. Then all of the children may do the counting and write the number that answers the question. The next exercise may be done in the same way; and then the next; and so on to the end of the page.

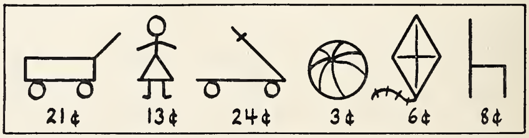
Follow-up Activities

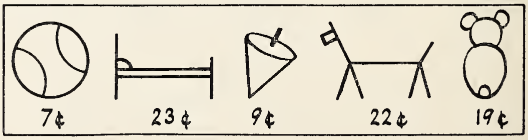
Additional learning helps. The children who had difficulty may be given more experience in counting actual coins or make-believe money. These experiences should continue until the teacher is sure that each child knows what he is to do and has developed reasonable skill in the counting. Then the children should do again any exercises in their book that caused difficulty and correct their mistakes.

Enrichment activities. The faster learners may help get materials ready for the next counting experience. They may cut from discarded magazines and catalogues pictures of toys, canned foods, etc. Some things should cost less than 10 cents and others cost more than 10 cents but less than a quarter. These pictures may be mounted on pieces of art paper, wrapping paper, etc. Then a price may be written below each article. If the pictures are not available, the children may make simple drawings.

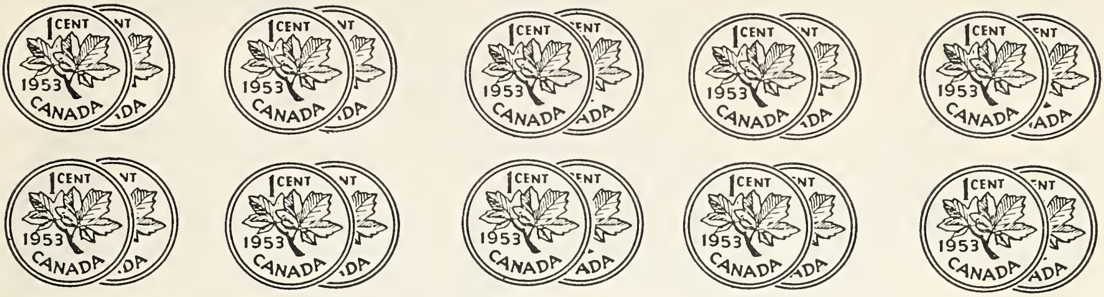
The children may make a store if they wish to do so. This plan may be followed:

They may measure and cut from a roll a strip of wrapping paper two or three yards long. If a roll of wrapping paper is not available, dry cleaning bags, salvaged wrapping paper, or discarded newspapers may be glued together. With a line drawn through the middle of the paper, the long way, the children will have two "shelves" on which the toys may be pasted. The shelves can hang on the wall with a table in front of them.



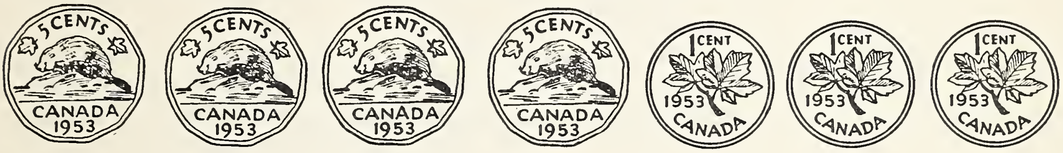


Count by twos.

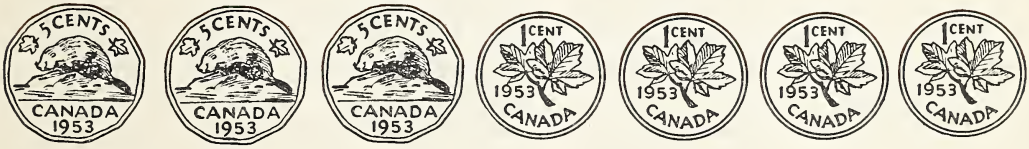


How much money? ______ ¢

Count the nickels as fives and the pennies as ones.

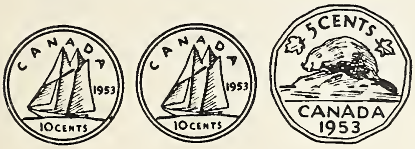


How much money? ______ ¢

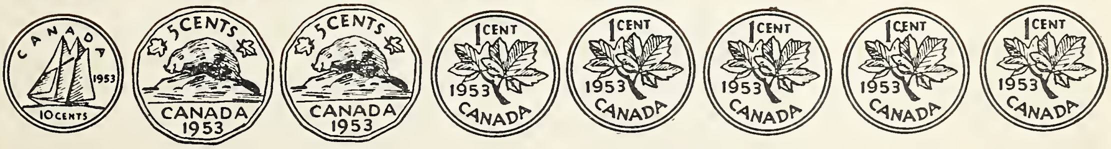


How much money? ______ ¢

Count the dimes as tens and the nickel as a five.



How much money? ______ ¢



How much money? ______ ¢

DECIDING WHEN TO ADD AND WHEN TO SUBTRACT IN NUMBER STORIES WITH LARGER NUMBERS

Preparatory Activities

The children have had much experience in deciding when to add and when to subtract in number stories that involve simple addition. On pages 134 and 135 of the pupil's book, number stories are given which use two-place numbers and which require a decision as to the process to use in finding the answer. There is also a practice exercise with examples which require the addition and subtraction of two-place numbers.

Solving problems as a group activity. It will be desirable to have the children read some number stories orally and work out the answers together before they use the exercise in their books. This will give the teacher an opportunity to help them become familiar with the technique to be used in the book, and also to make sure that they remember which sign means add and which sign means subtract. In addition to these things, the teacher will be able to help the children write correctly the examples which the number stories yield and place the signs in the correct position.

These stories, or similar stories growing out of classroom activities, may be written on the blackboard to be read by the children and solved:

The children wanted to have a play. They wrote letters to ask 56 children in the first grade and 43 children in the third grade to come. How many children did they ask to come to the play?

There were 87 children who wanted to come to the play in the morning and 12 who wanted to come in the afternoon. How many more children wanted to come to the play in the morning than in the afternoon?

There were 99 children who wanted to come to the play. But 12 of these children could not come. How many could come to the play?

The day they had the play, 51 children came from the first grade and 36 came from the third grade. How many children came to the play?

Write the words *Add* and *Subtract* near each story. Have the children read the first story and decide how to find the answer. Then have them draw a line around the word that tells how they will find the answer. Have them write the example from the number story. Ask what sign they need to show how they will find the answer. Then ask a child to write the sign beside the example. The children may work together to find the answer.

Proceed in the same way with the next number story. If the children have trouble in interpreting the story, which is stated in a way to require careful thought, the teacher may ask questions to guide their thinking.

The next two stories should be read orally and worked out in the same way. However, let the children gradually take more responsibility, with less help from the teacher.

Using Page 134

The children may find what the number stories are about by looking at the pictures and discussing them. Following this discussion, the first number story may be read orally by one of the children. Then the question below the story may be read by the group, and each child asked to respond to the question, circling the word *Add* or *Subtract* in his book, writing the example from the story, and writing the answer. As the children proceed through the several steps, the teacher will wish to observe the work to make sure that all of them understand just what they are to do. This procedure may be followed for the next story as well.

After that, the children should be ready to work independently through the remaining stories. The teacher will be conscious of those children who are likely to require still more help, and will give it as needed.

One day 33 boys and 32 girls
went to the big hill to play.
How many children went in all?

Do you add or subtract? **Add** **Subtract**

Write the numbers and the sign.
Find the answer.

There were 65 children. Some children
walked, but 12 went in cars.
How many children walked?

Do you add or subtract? **Add** **Subtract**

Write the numbers and the sign.
Find the answer.

When they got there, 11 boys and 23 girls
ran up the hill.
How many children ran up the hill?

Some of the boys went to look for birds.
They saw 25 birds in trees and 13 birds
on the ground. How many more birds
did they see in trees than on the ground?

Deciding When to Add and When to Subtract in Number Stories with Larger Numbers (continued)

Using Page 135

Page 135 is a continuation of the preceding page. The children may go right on with the number stories in the same way, working independently, with the teacher giving individual help as it may be needed by the various children.

If there is time available, and the teacher thinks it advisable, the children may do the exercise at the bottom of the page at this time. If not, the children may do these addition and subtraction examples on the next day.

Follow-up Activities

This is another exercise which the teacher will wish to evaluate herself. There are too many things to be kept in mind for the children to participate in the checking. However, after the teacher has made her evaluation and has tabulated the results, she may find it expedient to have the group work out together some of the number stories that they have worked in their books as individuals. She may wish to call to the attention of the whole group some things they did very well, or some things that caused them difficulty. For example, if the whole group read the number stories and interpreted them so that they knew which process to use, if they all knew which sign to use, and if they all wrote the numbers correctly, these things may be called to their attention. If the opposite is true, then there will need to be some reteaching of those points.

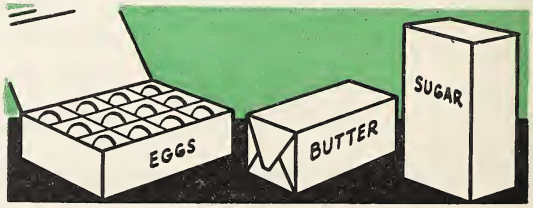
In the same way, individuals should have pointed out to them both their strengths and the particular things they need to learn more about.

Additional learning helps. If some of the children need help in deciding which process to use in solving a problem, the teacher may give them some number stories of the same type as those in the book. The stories may be worked out orally so that the teacher can guide the thinking and also discover what seems to cause the difficulty. After the children have had some help as a group, they may again work out the stories in their book which caused difficulty.

If there are children who had difficulty with some of the addition and subtraction facts, they may be given a list of the facts they need to learn. Then they may proceed in the usual way to learn the facts. They should work first with concrete objects, and then use the illustrated study and practice cards for those facts they missed. After they are sure of the facts, the children may write them three or four times.

It may be a good plan to provide a set of practice examples in addition and subtraction of two-place numbers for these children. The facts they missed, and have just studied, may be used in the examples, along with some of the other addition and subtraction facts.

Enrichment activities. The faster learners may be given other work to do at this time, or they may choose activities in other subjects. Some of the children may be interested in learning about the dozen and the pound, for example. After the teacher works with them long enough to help them understand the terms and the way we use them, the children may be able to find pictures of things we buy by the pound and by the dozen.



Mary and Sue went to get leaves
to make hats. They got 57 little leaves
and 32 big leaves. How many leaves
did they get in all?

Jane and Ruth looked for flowers.
Jane counted 89 flowers. Ruth counted 61.
How many more flowers
did Jane count than Ruth?

After dinner some children played circus.
In the circus, 22 children were clowns
and 34 children were animals.
How many children played circus?

After that, 48 children began to sing
under the trees and 13 children began
to play ball. How many more children
were singing than playing ball?

Add or subtract, and write the answers.

96	52¢	97	51	79¢	61	89	82¢
−32	+45¢	−43	+38	−25¢	+36	−26	+17¢
32	98¢	79	64	87¢	73	41	98¢
+56	−75¢	−52	+25	−34¢	+16	+37	−31¢

LEARNING HOW TO COUNT CHANGE

Preparatory Activities

Many of the out-of-school experiences of young children are concerned with buying and selling. They need to develop the ability to count change and the habit of counting their change each time they buy something and receive change. They will be interested in the activity, since it is useful to them.

The program in Grade Two has included training in the recognition of coins, their value, and the relationships among them. It has included also a variety of experiences in counting, including the counting of money. Counting change should not be a difficult learning step.

The exercises provided on pages 136 and 137 of the pupil's book are planned to help the children take this learning step. The exercises are based upon the types of experiences children meet in their daily activities in school and out of school.

Using concrete experiences. Actual coins or toy money may be used to introduce this new experience. The teacher may wish to review counting money before counting change is introduced. The children may count nickels and pennies, dimes and pennies, dimes and nickels, and finally dimes, nickels, and pennies, up to 25 cents. It will be well to review the concept that the last number we say, as we count the money, tells how much we counted.

Perhaps a child bought a pencil, an apple, or a bottle of milk today and received some change when he paid for it. He may tell about the experience, and perhaps show how the change was counted. If he is unable to do so alone, the teacher may help him. For example, the teacher may tell this story:

Fred bought a pencil at the store for 3 cents. He gave the man in the store a dime. The man probably said, "Here is your change, Fred. The pencil was 3 cents; four, five, ten cents." (The teacher will wish to demonstrate the story with a pencil, two pennies, and a nickel.)

Then the teacher may explain why the man said "3 cents," which was the price of the pencil, and why he counted "four, five, ten cents," in giving Fred the change for his dime.

Perhaps other children have recently made similar purchases of things that cost less than 10 cents. If so, each of them may have a turn at telling about it and demonstrating the way the change was counted. Actual money should be used, if possible, in carrying out the demonstrations.

The toy store, which was suggested earlier, may be used also. The children may dramatize buying and selling, with one child buying a toy for less than 10 cents, and another acting as storekeeper and counting the change. Again, real money should be used if possible; if not, toy money may be used.

After adequate practice has been provided in making change for a dime, making change for a quarter can be demonstrated several times. The children may then continue buying and selling at the play store, or a make-believe store if no play store is available, pretending to buy things for less than 25 cents, and receiving change for a quarter. They should use real money, if possible.

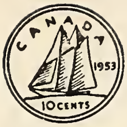
Finally, each child may use his make-believe money, choose something he wishes to buy for less than 10 cents or less than 25 cents, and count the change as the teacher observes him do so.

Using Page 136

The children may write the answers for the exercise at the top of the page. Then they may discuss the change we can get for a dime.

The children may work out the next exercise together, with several children having a turn at counting the pennies. Then the next three exercises may be done independently by each child.

The teacher will wish to work with those who need help, using actual coins or toy money to demonstrate the procedure.



What change can you get for a dime?

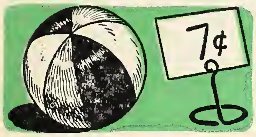
You can get ______ pennies for a dime.

You can get ______ nickels for a dime.

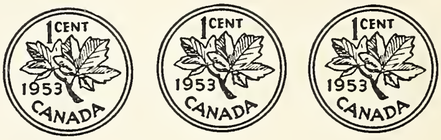
You can get 1 nickel and ______ pennies for a dime.

Buy a ball for 7¢. Give the man a dime.
Count the change you get.

You buy a ball.



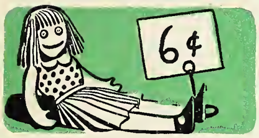
You get this change.

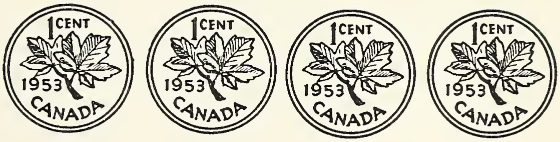


Think, "7¢ for the ball." Count the change. 8 9 10

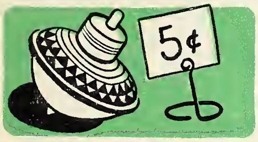
Did you get the right change for a dime?

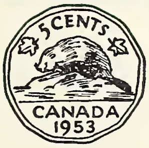
Play that you buy the toys and give the man
a dime each time. Write the numbers
to show how you count the change.



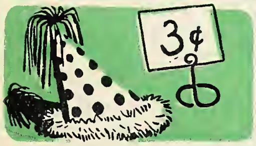


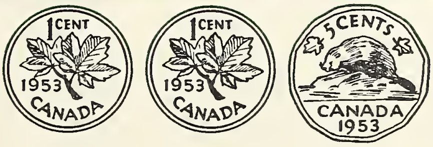
Think, ________ ¢ Count: ________ ________ ________ ________





Think, ________ ¢ Count: ________





Think, ________ ¢ Count: ________ ________ ________

Learning How to Count Change (continued)

Using Page 137

The same procedure may be used for this page as was suggested for the preceding page. The children will do the first exercise alone. Then it may be discussed. The next exercises may be done by the children alone, with the teacher helping whenever help is needed. Again, actual coins or toy money may be used in giving individual help.

Follow-up Activities

Additional learning helps. If some of the children need further help with making change, more experiences such as those suggested for preparatory activities may be given. For example, actual coins may be used to show what change might be given for a dime when a 9-cent purchase was made. Then change might be made for a dime when an 8-cent purchase, a 7-cent purchase, a 6-cent purchase, a 5-cent purchase, and a 4-cent purchase were made. In the last case, the change would be a penny and a nickel.

After all the possible situations in making change for a dime have been demonstrated, experiences in making change for a quarter may be provided. It may be helpful to have the children start with purchases in this order: 24 cents, 23 cents, 22 cents, 21 cents, etc. From that time on, through purchases of less than 5 cents, the children have a choice between ways of receiving change. For example, in making change for a quarter when the purchase is 9 cents, the change may be 1 penny and 3 nickels; 1 penny, 1 dime, and 1 nickel, etc.

All of the possibilities for making change for a purchase should be used. The children should discover that when they spend the amount indicated at the left, below, the change for a quarter may be given in any of the ways shown at the right:

Purchases	*Possible Change for a Quarter*
10 cents	1 dime and 1 nickel; or 1 dime and 5 pennies; or 3 nickels, etc.
9 cents	1 penny and 3 nickels; or 1 penny, 1 dime, and 1 nickel; etc.
8 cents	2 pennies and 3 nickels; or 2 pennies, 1 dime, and 1 nickel; etc.
7 cents	3 pennies and 3 nickels; or 3 pennies, 1 dime, and 1 nickel; etc.
6 cents	4 pennies and 3 nickels; or 4 pennies, 1 dime, and 1 nickel; etc.
5 cents	4 nickels; or 1 nickel, 1 dime, and 1 more nickel; or 2 dimes, etc.

Enrichment activities. The children who had no difficulty with making change for a dime and a quarter may use their skill by playing store. However, they may be more interested in getting ready to make change for a half dollar and to tell time to the nearest five minutes. These learning steps will be taken later, but the skills are useful now in out-of-school experiences. To take these learning steps the children will need to be able to count by fives to 60, and to count by ones, fives, and tens to 50. For example, they will need to be able to count 60 minutes on the clockface by fives; and count by ones from 32 to 35, by fives to 40, and by tens to 50 in counting change.

These children may be interested also in continuing their experiences in counting by two to 50, to 60, or to 100. If it seems worthwhile to have them extend their ability to count in this way, the number chart of numbers to 100 will be helpful to them. The even numbers may be underlined in red or another color on the chart so that they stand out and can be read easily.

The experience should begin with counting actual objects—pennies, or the child's own counters. Then he should read the even numbers from the chart. Finally, he should apply what he has learned to counting various things by twos to find how many there are in the box, or stack, or group.

What change can you get for a quarter?

Can you get 25 pennies? Yes No

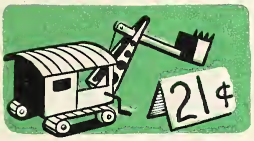
Can you get 2 dimes and a nickel? Yes No

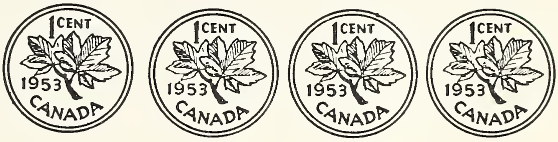
Can you get 3 dimes? Yes No

Can you get 5 nickels? Yes No

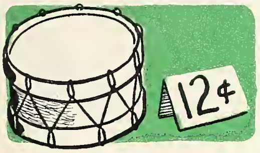
Can you get 2 dimes and 5 pennies? Yes No

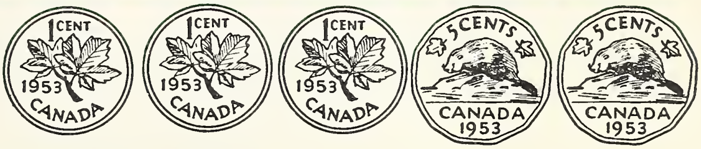
Play that you buy the toys and give the man a quarter each time. Write the numbers to show how you count the change.



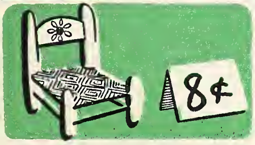


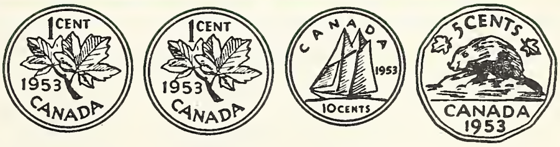
Think, ________ ¢ Count: ________ ________ ________ ________



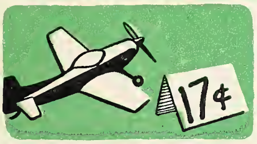


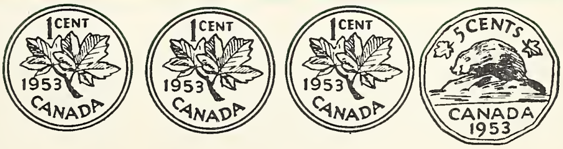
Think, ________ ¢ Count: ________ ________ ________ ________ ________





Think, ________ ¢ Count: ________ ________ ________ ________





Think, ________ ¢ Count: ________ ________ ________ ________

USING ADDITION AND SUBTRACTION OF LARGER NUMBERS

Preparatory Activities

The number stories and examples presented at this time provide practice in the addition and subtraction of two-place numbers. The number stories necessitate a decision as to the process to be used in finding the answer to the question in the story

Interpreting number stories as a group activity. Since deciding what process to use with problems having two-place numbers is the most recently introduced learning step in addition and subtraction, the teacher will probably think it expedient to provide an oral exercise so that the group can read and interpret together some number stories with two-place numbers. These or similar stories may be used as a blackboard exercise:

All the children in the school were going to have an outdoor play day. There were 52 boys and 46 girls in the flag parade. How many children were in the parade?

There were 58 boys and 41 girls who wanted to play cowboy and Indian. How many more boys than girls wanted to play this game?

At first there were 57 children in the foot race. But 25 of them stopped running. How many children were in the race then?

There were 31 girls and 18 boys on swings. How many children were swinging?

There were 64 girls and 42 boys in the ball game. How many more girls than boys were in this game?

Before the children read the stories it may be helpful to remind them to think about the stories and the questions, and decide what to do as they read.

The example from each story may be written on the blackboard. Then the sign that tells how to find the answer may be written in the example. The children should be reminded again to begin at the right when adding or subtracting.

Using Page 138

After the children study the picture and find what the number stories are about, they may read the stories independently and find the answers. If there are children who seem to be having difficulty, the teacher may work with them individually.

Finally, the children may read the directions above the examples and follow them.

Follow-up Activities

The teacher and children may evaluate the work together. Since this is a practice exercise on a recently introduced type of work, it may be worth while to discuss the stories and try to emphasize the things that aid interpretation.

For example, the teacher may ask the following questions:

What did you do to find the answer for the first question? What helped you to think you should subtract? What sign did you write in the example?

Read the answer to the question in the story. Then find how many children had the correct answer and proceed with the next number story and the examples.

Additional learning helps. If there are any children who had difficulty with the number stories, they may be helped to read the stories again and try again to find the answers. If some children missed addition or subtraction facts either in the stories or the examples, they should be helped to make a list of the facts and try again to learn them. After they use concrete objects and study the facts, they may be given examples that use the facts they missed.

Enrichment activities. The children who do not need help at this time may continue some of their supplementary arithmetic activities, such as learning more about counting, making change, or measures. If they prefer, they may do some work which needs to be done in other subjects.

Bob and Sue went to Grandfather's farm.
They helped Grandfather feed the hens.
They counted 47 brown hens
and 31 white hens.
How many more brown hens
than white hens were there?

Grandfather said that he had 78 hens
and 27 ducks. How many more hens
than ducks did he have?

They went to the hen house to get the eggs.
Bob found 53 eggs and Sue found 15.
How many eggs did they find?

Grandfather had 68 eggs in a big basket.
He sold 36 of them. How many eggs
did Grandfather have then?

Add or subtract, and write the answers.

97	52¢	98	65¢	89	67	52	79¢
−63	+46¢	−42	+32¢	−52	−25	+32	−63¢

96	89¢	31	68¢	74	79	41	98¢
−85	−37¢	+68	−41¢	+25	−41	+25	−54¢

MAKING SURE OF TELLING TIME AND FRACTIONS

Preparatory Activities

The eighth "Making Sure" test, and the first in a group of tests for the evaluation of the year's work, is provided on page 139. The test will help to determine how well the children have learned to tell time and whether or not they understand the fractions *one-half, one-fourth,* and *one-third.*

No particular preparation will be needed, except to stimulate an interest in finding what has been learned during the year. The children may be told, for example, that on the next six pages, they will have a chance to do again many of the kinds of work that they have done in arithmetic all year.

Using Page 139

Tell the children that the sentences below the pictures tell them what to do. Explain that on the clocks there is just an hour hand, or short hand. They are to draw the minute hand, or long hand. Show the procedure on the blackboard if necessary. Then let the children follow the directions.

Tell the children that one pie is cut into halves, another into thirds, and another into fourths. The sentences will tell them how to color the pictures. But they will have to find the right picture to color each time. Then let them read the directions and follow them.

Follow-up Activities

The teacher will wish to look over the children's work very carefully to find how well they were able to do the exercises. If she is keeping a record of progress for each child, notes concerning his work in telling time and fractions may be made.

In addition to this, the teacher will wish to make a tabulation of the successes and failures of the group as a whole. In this way she can have an excellent idea of the things the children have learned and those that have proved to be especially difficult for this class.

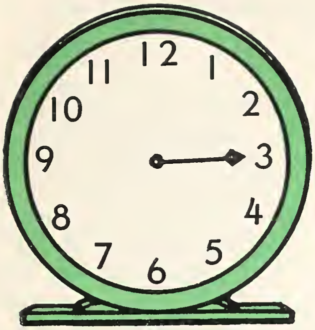
What is done to follow up the tests will depend somewhat upon the length of time before the end of the term. It will depend also upon the use the teacher plans to make of the tests. If they are to be used as the basis for planning a term-end review, and if there is time available for such a review, the suggestions given below will be helpful.

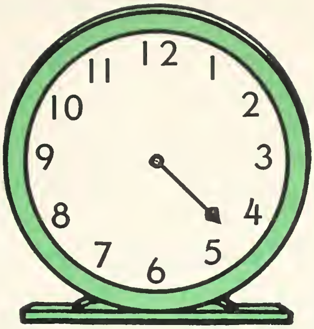
Additional learning helps. If some of the children had difficulty in drawing the minute hands to show the hour and the half-hour, the teacher will wish to have them work with a real clock or a toy clock again. First the children may be helped to read the time shown by the clock. This is the easiest step in the learning process. Then they may be helped to set the hands to show the time at various hours and half-hours. Finally, they may have help in drawing the minute hands to show the time at various hours and half-hours.

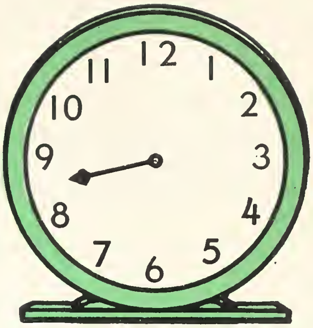
If some of the children had difficulty recognizing and demonstrating that they understand the fractions *one-half, one-fourth,* and *one-third,* this group also may have more experiences with concrete materials. The collection from the arithmetic table may be used for purposes of matching, comparing, and finding the fractional parts. The children may have help in dividing such things as sheets of paper, pieces of string, pie plates, etc., into two equal parts, three equal parts, and four equal parts, and learning to name the parts.

This extra chance to learn may be all that is needed by some children to enable them to understand the concepts. If that is accomplished, they will have less difficulty with the work of the next year.

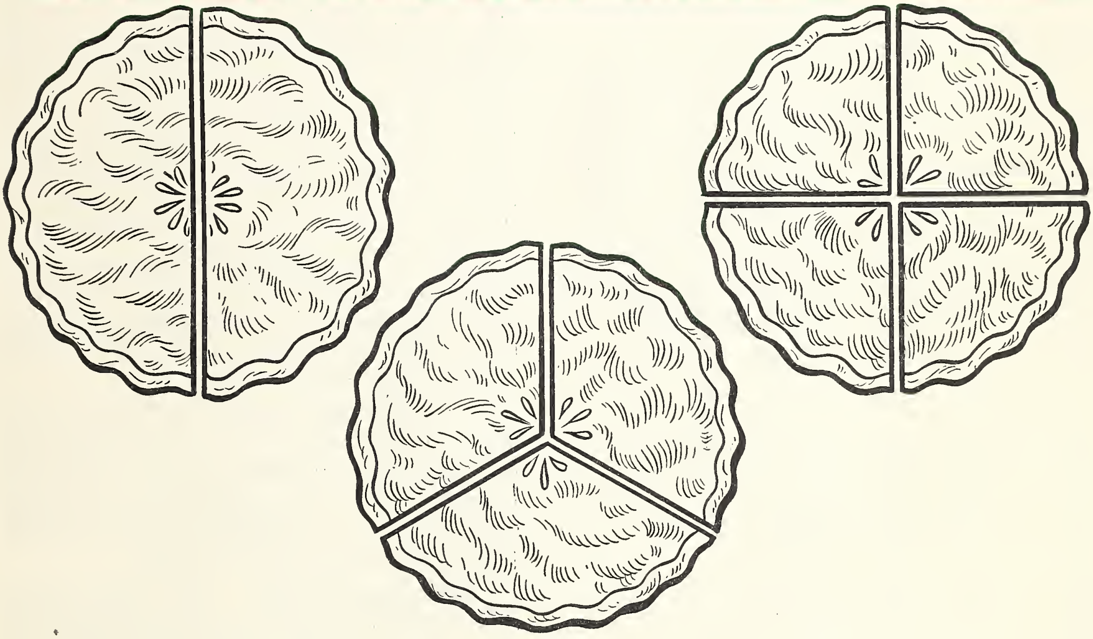
Enrichment activities. The children who do not need help may be interested in getting their arithmetic folder or scrapbook ready to take home at the close of the term.







Make the first clock show 3 o'clock.
Make the second clock show half past 4.
Make the third clock show half past 8.



Color one-half of a pie red.
How many halves in the pie? ____

Color one-fourth of a pie brown.
How many fourths in the pie? ____

Color one-third of a pie yellow.
How many thirds in the pie? ____

MAKING SURE OF THE FORTY-FIVE ADDITION FACTS

Preparatory Activities

The ninth "Making Sure" test includes two number stories that require addition and one that involves subtraction. This is planned to test recognition of addition situations. The test includes examples that use all of the 45 addition facts. No special preparation is necessary for the exercises in the test on this page.

Using Page 140

The pictures will help the children find what the stories are about. Then they may read the stories and find the answers. Each child may go right on with the exercise at the bottom of the page as soon as he finishes the number stories.

Follow-up Activities

The teacher will wish to make a careful tabulation of the results of the test. If a review is planned, it should help the children see relationships among the facts.

The teacher may ask the children to say as many facts as they can in which 1 is the first number. She should get: 1 and 1 are 2, 1 and 2 are 3, etc., to 1 and 9 are 10. Then she may ask for the facts in which 2 is the first number, and so on to 9. These facts may be put on the blackboard or a chart of squared paper. The 45 facts should appear in the order of the examples listed below:

$$\begin{array}{ccccccccc}
1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 \\
\underline{1} & \underline{2} & \underline{3} & \underline{4} & \underline{5} & \underline{6} & \underline{7} & \underline{8} & \underline{9} \\
2 & 2 & 2 & 2 & 2 & 2 & 2 & 2 & \\
\underline{1} & \underline{2} & \underline{3} & \underline{4} & \underline{5} & \underline{6} & \underline{7} & \underline{8} & \\
3 & 3 & 3 & 3 & 3 & 3 & 3 & & \\
\underline{1} & \underline{2} & \underline{3} & \underline{4} & \underline{5} & \underline{6} & \underline{7} & & \\
4 & 4 & 4 & 4 & 4 & 4 & & & \\
\underline{1} & \underline{2} & \underline{3} & \underline{4} & \underline{5} & \underline{6} & & & \\
5 & 5 & 5 & 5 & 5 & & & & \\
\underline{1} & \underline{2} & \underline{3} & \underline{4} & \underline{5} & & & & \\
6 & 6 & 6 & 6 & & & & & \\
\underline{1} & \underline{2} & \underline{3} & \underline{4} & & & & & \\
7 & 7 & 7 & & & & & & \\
\underline{1} & \underline{2} & \underline{3} & & & & & & \\
8 & 8 & & & & & & & \\
\underline{1} & \underline{2} & & & & & & & \\
9 & & & & & & & & \\
\underline{1} & & & & & & & &
\end{array}$$

Additional learning helps. Those children, if there are any, who still have difficulty with addition, or with the addition facts, may be given another chance to learn the facts they have not learned and to understand problem situations that call for addition. Although this work will all be retaught early in Grade Three, these children will be better able to take the work in stride if at this time they go as far as possible in the direction of understanding, and gain as much ability as possible in the use of the facts. They should be given one more chance to learn, since this chance may mean a final awakening of understanding.

The procedures for reintroduction of the addition process and the redevelopment of facts that individuals have missed may be followed again. The emphasis for each child should be on the specific facts he missed. He should be given a list of these.

Enrichment activities. The children who do not need help may continue to review the facts. For example, they may assemble the illustrated group cards and the related unit cards that were made for the arithmetic table. They may put these cards in stacks according to size of sums, organizing them by sums of 2, of 3, of 4, of 5, of 6, etc. Or they may organize them according to the top number, or first addend, as was suggested for the chart.

These cards may be arranged for display purposes if an exhibit of work and materials is being planned.

The children made some toys. John made 4 cars for a train. Tom made 5 cars.
How many cars did they make? ______

Mary made 9 animals.
She gave 3 of them to Sue.
How many animals did Mary have then? ______

Dick made 3 boats. Bob made 6 boats.
How many boats did the boys make? ______

Add, and write the answers.

$\begin{array}{r}4\\\underline{1}\end{array}$	$\begin{array}{r}9\\\underline{1}\end{array}$	$\begin{array}{r}1\\\underline{2}\end{array}$	$\begin{array}{r}3\\\underline{3}\end{array}$	$\begin{array}{r}7\\\underline{3}\end{array}$	$\begin{array}{r}2\\\underline{6}\end{array}$	$\begin{array}{r}1\\\underline{8}\end{array}$	$\begin{array}{r}8\\\underline{2}\end{array}$	$\begin{array}{r}3\\\underline{1}\end{array}$
$\begin{array}{r}2\\\underline{8}\end{array}$	$\begin{array}{r}3\\\underline{2}\end{array}$	$\begin{array}{r}7\\\underline{2}\end{array}$	$\begin{array}{r}2\\\underline{5}\end{array}$	$\begin{array}{r}4\\\underline{2}\end{array}$	$\begin{array}{r}1\\\underline{3}\end{array}$	$\begin{array}{r}6\\\underline{2}\end{array}$	$\begin{array}{r}2\\\underline{2}\end{array}$	$\begin{array}{r}5\\\underline{4}\end{array}$
$\begin{array}{r}6\\\underline{1}\end{array}$	$\begin{array}{r}4\\\underline{3}\end{array}$	$\begin{array}{r}1\\\underline{4}\end{array}$	$\begin{array}{r}6\\\underline{4}\end{array}$	$\begin{array}{r}1\\\underline{1}\end{array}$	$\begin{array}{r}2\\\underline{4}\end{array}$	$\begin{array}{r}5\\\underline{3}\end{array}$	$\begin{array}{r}1\\\underline{7}\end{array}$	$\begin{array}{r}3\\\underline{4}\end{array}$
$\begin{array}{r}5\\\underline{2}\end{array}$	$\begin{array}{r}4\\\underline{4}\end{array}$	$\begin{array}{r}3\\\underline{5}\end{array}$	$\begin{array}{r}2\\\underline{3}\end{array}$	$\begin{array}{r}4\\\underline{5}\end{array}$	$\begin{array}{r}1\\\underline{5}\end{array}$	$\begin{array}{r}7\\\underline{1}\end{array}$	$\begin{array}{r}3\\\underline{6}\end{array}$	$\begin{array}{r}1\\\underline{9}\end{array}$
$\begin{array}{r}6\\\underline{3}\end{array}$	$\begin{array}{r}2\\\underline{1}\end{array}$	$\begin{array}{r}3\\\underline{7}\end{array}$	$\begin{array}{r}1\\\underline{6}\end{array}$	$\begin{array}{r}8\\\underline{1}\end{array}$	$\begin{array}{r}2\\\underline{7}\end{array}$	$\begin{array}{r}5\\\underline{5}\end{array}$	$\begin{array}{r}5\\\underline{1}\end{array}$	$\begin{array}{r}4\\\underline{6}\end{array}$

MAKING SURE OF THE FORTY-FIVE SUBTRACTION FACTS

Preparatory Activities

The tenth in the series of "Making Sure" tests includes examples that use the 45 subtraction facts that have been introduced in Grade Two. The test includes also two number stories that involve subtraction and one that involves addition. In this way the recognition of situations that involve subtraction is tested.

Using Page 141

The children may study the pictures and discuss them to find what the stories are about. Then they may read the number stories independently and find the answers. After this, they may go on with the subtraction examples at the foot of the page.

Follow-up Activities

The teacher will be interested in making a careful evaluation of each child's work and recording his strengths and weaknesses. Then she will wish to tabulate the results of the test for the group as a whole. From this evaluation she will decide on the next steps to take in accordance with the plans for the remainder of the term.

If the plan includes a review, it is suggested that it be a *new view*. In subtraction, as well as in addition, it is now possible to lead the children to an understanding of relationships among the facts that has not been possible before. At the same time, seeing these relationships will help them gain an appreciation of what they have learned and a greater appreciation of arithmetic.

The following suggestions indicate some ways of accomplishing these purposes:

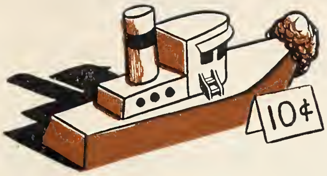
The game *I Am Thinking of an Example* may be used. The teacher, or a child, may say, "I am thinking of an example in which we take 1 from a number." The children may guess, "1 from 10? 1 from 9?" "1 from 8?" Then a variation may be used. "I am thinking of a subtraction fact in which the answer is 1." The children may guess, "9 from 10 is 1?" "8 from 9 is 1?" "7 from 8 is 1?"

Another variation brings out the relationships in a learning group. For example, the teacher or a child may say, "I am thinking of a subtraction fact that uses the numbers 2, 7, and 5. Can you name it and three other facts that use those numbers?" (The facts are: 2 from 7 is 5; 5 from 7 is 2; 5 and 2 are 7; 2 and 5 are 7.)

Ask the children to name all of the facts in which 1 is subtracted from a number; 2 is subtracted from a number; and so on to 9. A chart which lists the facts in the order of the examples below may be made from the responses.

$$\begin{array}{rrrrrrrrr}
2 & 3 & 4 & 5 & 6 & 7 & 8 & 9 & 10 \\
\underline{1} & \underline{1} & \underline{1} & \underline{1} & \underline{1} & \underline{1} & \underline{1} & \underline{1} & \underline{1} \\
3 & 4 & 5 & 6 & 7 & 8 & 9 & 10 & \\
\underline{2} & \underline{2} & \underline{2} & \underline{2} & \underline{2} & \underline{2} & \underline{2} & \underline{2} & \\
4 & 5 & 6 & 7 & 8 & 9 & 10 & & \\
\underline{3} & \underline{3} & \underline{3} & \underline{3} & \underline{3} & \underline{3} & \underline{3} & & \\
5 & 6 & 7 & 8 & 9 & 10 & & & \\
\underline{4} & \underline{4} & \underline{4} & \underline{4} & \underline{4} & \underline{4} & & & \\
6 & 7 & 8 & 9 & 10 & & & & \\
\underline{5} & \underline{5} & \underline{5} & \underline{5} & \underline{5} & & & & \\
7 & 8 & 9 & 10 & & & & & \\
\underline{6} & \underline{6} & \underline{6} & \underline{6} & & & & & \\
8 & 9 & 10 & & & & & & \\
\underline{7} & \underline{7} & \underline{7} & & & & & & \\
9 & 10 & & & & & & & \\
\underline{8} & \underline{8} & & & & & & & \\
10 & & & & & & & & \\
\underline{9} & & & & & & & &
\end{array}$$

Additional learning helps. If there are any children who need help with the subtraction process, or with some of the facts, the procedures suggested earlier may be used again.



Tom wants a boat that costs 10 cents.
He has 6 cents. How much more money
does he need? ______

Sue paid 6 cents for an apple and 4 cents
for a cake. How much money did she pay? ______

Bob had 10 cents.
He paid 7 cents for a ball.
How much money did he have then? ______

Subtract, and write the answers.

10 5	4 2	8 3	6 2	9 8	5 4	7 6	10 1	9 5
8 4	7 5	9 4	6 1	10 2	2 1	5 3	3 2	10 6
9 7	6 3	10 7	5 2	8 5	7 4	9 3	3 1	8 2
10 3	7 1	8 6	9 2	4 1	8 1	6 4	10 8	7 3
6 5	9 1	4 3	10 9	7 2	9 6	5 1	8 7	10 4

MAKING SURE OF NUMBERS AND MONEY

Preparatory Activities

The eleventh "Making Sure" test includes the meaning of two-place numbers, counting money, and an understanding of the value of one dollar in cents, dimes, quarters, and half dollars. No preparation is necessary for the test, except to continue to stimulate an interest in using the things that have been learned during the year.

Using Page 142

The teacher may think that it is necessary to explain that in the exercise at the top of the page the children are to write in the blanks the numbers that tell how many tens and ones each number means. In the next three exercises they are to count the money and tell how much there is in all. In the last exercise they are to write in the blanks the numbers that tell that a dollar is as much money as so many cents, dimes, quarters, and half dollars. Then the children may do the work independently.

Follow-up Activities

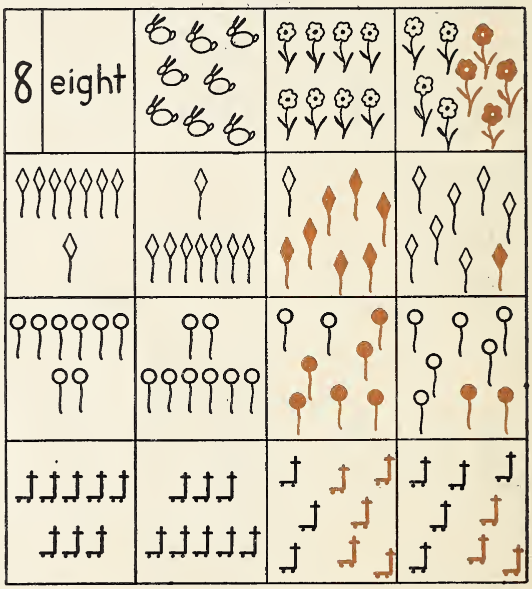
After the teacher evaluates the work of the children, and makes a record for each child to indicate what he has learned and what he has yet to learn, she will wish to make a tabulation for the group as a whole. From these records, she will be able to plan the work which is to follow, if time allows further work.

If a review is part of the plan, the teacher will wish to have the children take another look at our number system and perhaps try to enrich somewhat their understanding of numbers and what they mean. The following suggestions may fit into the plan:

The number charts, which were made earlier, may be used to call to the attention of the children some things they are probably vaguely aware of. For example, all of the numbers on the chart are made up of the figures 1 to 9 and zero. This can be emphasized by having the children read the numbers that have 1 in either the one's place or the ten's place; then having them read all of the numbers that have 2 in them, etc.

Reading the numbers that come before and after a stated number is also a good experience for helping emphasize sequence.

The materials that have been developed to help the children understand the meaning of the numbers 1 to 10 may now be brought together for review. From time to time the children have made cards for each number, such as those shown here for the number 8.



Additional learning helps. If some of the children need help in understanding the meaning of number, or the value of coins, or need more work in counting money, concrete materials should be used again. Experiences in counting money may be centred around buying and making change.

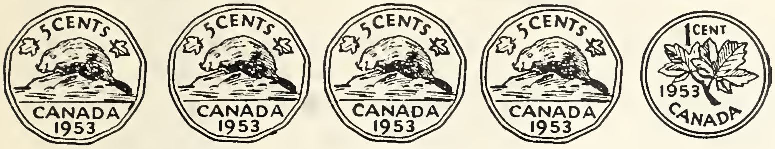
Enrichment activities. The faster learners may continue to assemble the materials on the arithmetic table. Those related to numbers and our number system may be prepared for a display at this time.

67 means ____ tens and ____ ones

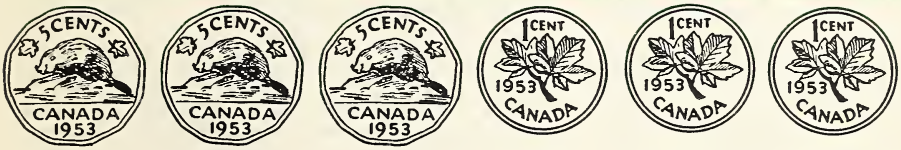
96 means ____ tens and ____ ones

40 means ____ tens and ____ ones

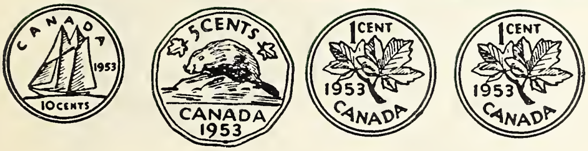
15 means ____ ten and ____ ones



How much money? ______ ¢



How much money? ______ ¢



How much money? ______ ¢

A dollar is as much money as

______ cents

or ______ dimes

or ______ quarters

or ______ half dollars

MAKING SURE OF COLUMN ADDITION

Preparatory Activities

The twelfth of the "Making Sure" tests includes number stories and examples that involve column addition. The test will enable the teacher and the children to find how well column addition has been learned and how well the children write examples from stories. No preparation is necessary, unless the teacher finds that some of the words in the number stories should be introduced before the children read them.

Using Page 143

The picture may be discussed to give the children an idea of what the stories are about. Then the children may read the stories and find the answers independently.

As soon as the number story exercise has been completed, the children may read the directions above the examples, and then do that part of the test.

Follow-up Activities

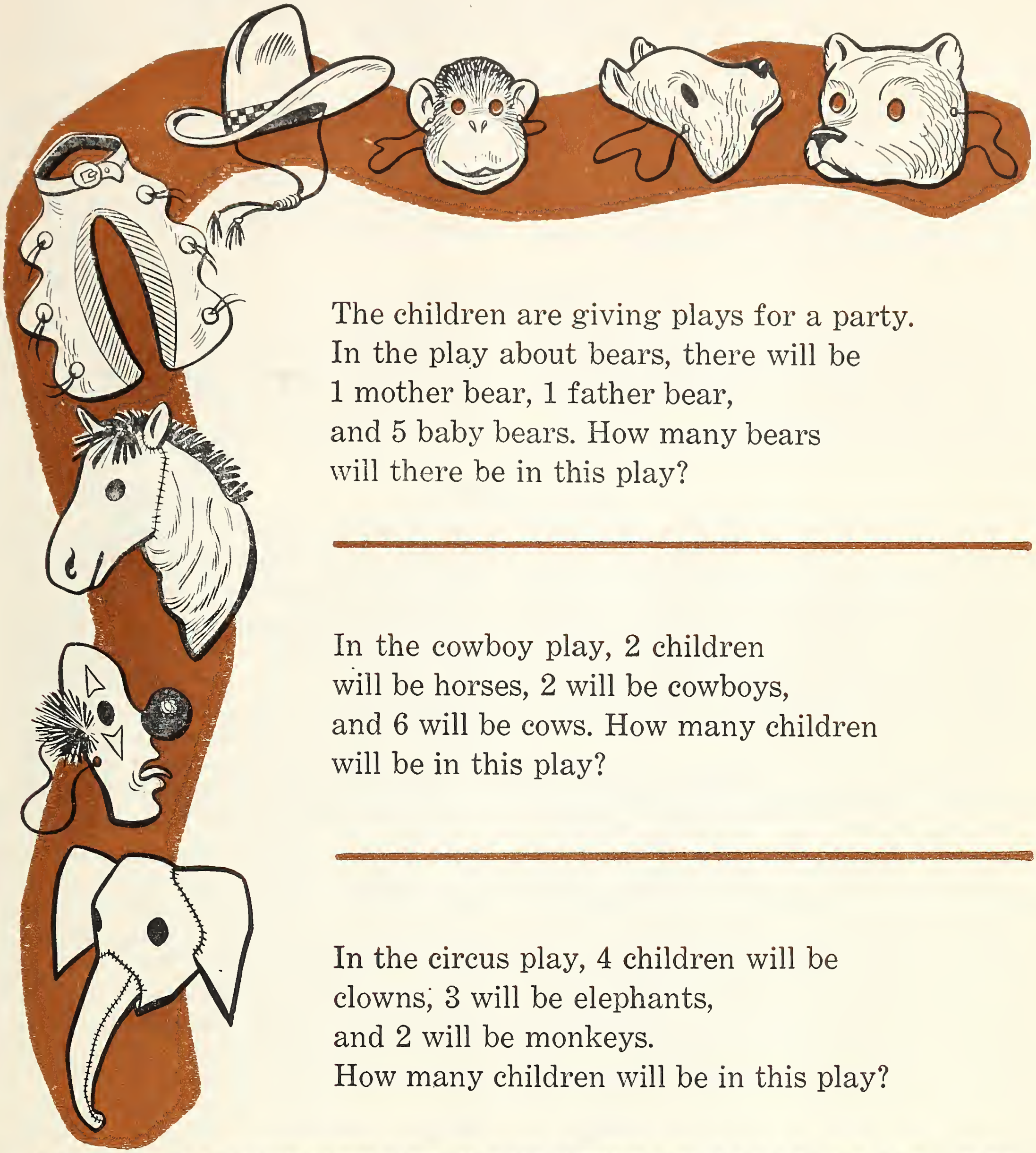
There are several things to evaluate in this test. The teacher will be interested in examining each child's work to find how well he did in the problem solving test. She will also be interested in observing the skill with which the children wrote the numbers in the examples which the number stories yielded. Often young children make mistakes in reading or in writing the numbers in such situations. An analysis will reveal how frequently that happened in this case.

After the teacher finds which children, if any, made mistakes in addition, she will need to hear the individual children add the examples orally to find what their specific mistakes were. However, the teacher will probably have at hand each child's record of work for the year. It may help her to interpret the results of this test.

Additional learning helps. It is quite likely that the most effective help that can be given at this time is to discuss the mistakes made with the individual children, if those are minor in nature. In this case, perhaps they can be corrected by pointing out something which the child misunderstood and by letting him do the example again.

If there are children who still are confused by the column addition process, and the teacher feels that detailed reteaching will be required, the best procedure probably is to let it wait until the process is retaught in Grade Three.

Enrichment activities. The children who do not need help may choose other things to do. These activities may be in another subject, unless there are unfinished arithmetic activities which should be completed.



The children are giving plays for a party.
In the play about bears, there will be
1 mother bear, 1 father bear,
and 5 baby bears. How many bears
will there be in this play?

In the cowboy play, 2 children
will be horses, 2 will be cowboys,
and 6 will be cows. How many children
will be in this play?

In the circus play, 4 children will be
clowns, 3 will be elephants,
and 2 will be monkeys.
How many children will be in this play?

Add, and write the answers.

1	1	2	1	2	3	6	1	1	3
5	1	6	2	2	5	1	1	3	6
4	8	1	7	2	2	3	7	5	1

MAKING SURE OF ADDITION AND SUBTRACTION OF LARGER NUMBERS

Preparatory Activities

The thirteenth and last in the series of "Making Sure" tests includes number stories which involve addition and subtraction of two-place numbers. A set of addition and subtraction examples with two-place numbers is included, also. There may be words in the number stories which should be introduced before the children read the stories in their books. Other than this, no preparation for the test is necessary.

Using Page 144

The children may find what the stories are about by studying and discussing the pictures. Then they may read the stories and find the answers independently. After they have finished the problem solving exercise, the children may read the directions for the next exercise. Then they may add or subtract and write the answers.

Follow-up Activities

The teacher's evaluation of the children's work should include a careful study of each child's strengths and weaknesses as revealed by the test. It should include also a tabulation for the class as a whole. From this study the teacher will be able to plan the follow-up activities that seem most appropriate.

Additional learning helps. If there are children who seem confused about the addition and subtraction of two-place numbers and obviously require a rather detailed reteaching of these processes, it would probably be best to let them wait for the reteaching in Grade Three. However, if some children made minor mistakes which can be corrected quite easily it would seem wise to discuss the mistakes with the individual children and help them find the way to do the stories and examples correctly. If they need only another chance to learn, it should be provided, even though they will have another opportunity to learn next year.

Enrichment activities. The children who do not need help at this time may choose other things to do. Perhaps they wish to complete their arithmetic folders or scrapbooks. They may have work to do in other subjects which can be done at this time.

If a display of the children's work and the arithmetic materials has been assembled, perhaps these children will enjoy looking at the displays. Such an experience will give them a sense of achievement and a feeling of satisfaction in all the new things they have learned during the year. It will also help them to look forward to the new work which will come next year. This feeling of learning and growing is important to the development of a sense of security in children.

The boys wrote 21 letters to ask their mothers and fathers to come to a party. The girls wrote 13 letters. How many letters did the children write?

The answers to the letters said that 32 mothers and 14 fathers could come to the party. How many could come in all?

The children made 68 little books to give to the mothers and fathers. They needed 46 books. How many more books did they make than they needed?

The children made 89 little cakes for the party. The mothers and fathers and the children ate all but 15 of the cakes. How many cakes did they eat?

Add or subtract, and write the answers.

72¢	89	64¢	98	43¢	87	13	99¢
+25¢	−24	+34¢	−23	+36¢	−53	+85	−61¢

79¢	65	79¢	52	87¢	32	98	54¢
−45¢	+24	−53¢	+37	−62¢	+46	−74	+25¢

Date Due

[illegible]
NOV 7 RETURN
EDUC [illegible] 2 [illegible] '78
MAR 1 9 RETURN
[illegible] 18 RETURN
EDUC [illegible] '78
MAY 7 RETURN
EDUC MR 6 [illegible]
RETURNED MAR - 1 '78
[illegible] -6 '78
RETURNED NOV 6 '78

2 3 4 5 6 7 8 9 10 63 62 61 60 59 58 57

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